



US seq list.ST25.txt  
SEQUENCE LISTING

<110> Hotez, Peter  
Ashcom, James  
Bdamchian, Mahnaz  
Zhan, Bin  
Wang, Yan  
Hawdon, John  
Loukas, Alexander  
Williamson, Angela  
Jones, Brian  
Bethony, Jeffrey  
Goud, Gaddam  
Botazzi, Maria E.  
Mendez, Susana

<120> Hookworm Vaccine

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<150> US 60/329,533

<151> 2001-10-17

<150> US 60/332,007

<151> 2001-11-23

<150> US 60/375,404

<151> 2002-04-26

<150> PCT US02/33106

<151> 2002-10-17

<160> 114

<170> PatentIn version 3.2

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<213> Necator americanus

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Thr Asp Ser Asp Arg Gln Ala Phe Leu Asp Phe His Asn Asn Ala Arg
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US seq list.ST25.txt

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Gly Leu Phe Ala Phe Ser Asn Met Val Tyr Ser Glu Thr Thr Lys Leu  
145 150 155 160

Gly Cys Ala Tyr Lys Val Cys Gly Thr Lys Leu Ala Val Ser Cys Ile  
165 170 175

Tyr Asn Gly Val Gly Tyr Ile Thr Asn Gln Pro Met Trp Glu Thr Gly  
180 185 190

Gln Ala Cys Gln Thr Gly Ala Asp Cys Ser Thr Tyr Lys Asn Ser Gly  
195 200 205

Cys Glu Asp Gly Leu Cys Thr Lys Gly Pro Asp Val Pro Glu Thr Asn  
210 215 220

Gln Gln Cys Pro Ser Asn Thr Gly Met Thr Asp Ser Val Arg Asp Thr  
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Gly Glu Asn Ile Tyr Lys Thr Ser Val Leu Lys Phe Asp Lys Asn Lys  
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355

360

365

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Cys Gln Tyr Gly Pro Gly Gly Asn Tyr Met Gly His Val Ile Tyr Thr  
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Gly Lys Lys Val Thr Ala Phe Leu Gly Val Pro Tyr Gly Gln Pro Pro  
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Thr Gly Glu Leu Arg Phe Ser Asn Pro Lys Met Val Gln Arg Trp Glu  
65 70 75 80

Gly Ile Lys Asn Ala Thr Thr Pro Ala Gln Pro Cys Phe His Phe Pro  
85 90 95

Asp Ser Lys Phe Lys Gly Phe Arg Gly Ser Glu Met Trp Asn Pro Lys  
100 105 110

Gly Asn Met Thr Glu Asp Cys Leu Asn Met Asn Ile Trp Val Pro His  
Page 5

125

Lys Asp Glu Ala Thr Phe Phe Leu Pro Tyr Tyr Phe Gly His Asn Gly  
355 360 365

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385 390 395 400

Ser Leu Glu Ser Ser Leu Glu Pro Leu Leu Glu Ala Tyr Lys Asn Val  
405 410 415

Ser Thr Arg Lys Glu Glu Gly Glu Arg Leu Arg Asp Gly Val Gly Arg  
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Phe Met Gly Asp Tyr Phe Tyr Thr Cys Ser Val Ile Asp Phe Ala Asn  
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Ile Val Ser Asp Ile Ile Asn Gly Ser Leu Tyr Met Tyr Tyr Phe Thr  
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US seq list.ST25.txt

<213> Necator americanus

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US seq list.ST25.txt

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Gln Val Ile Ala Phe Ile Thr Ala Thr Thr Lys Lys Met Thr Ile Gly  
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Gln Asp Glu Lys Gln Thr Arg Val Gly Phe Ile Thr Tyr Gly Glu Glu  
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Ala Lys Leu Ile Tyr Asp Leu Asp His Trp Arg Ser Thr Glu Lys Leu  
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Ser Asp Leu Val Gln Lys Ile Pro Tyr Val Lys Ser Ser Gly Thr Asn  
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Ile Ala Ala Ala Ile Ala Leu Ala Asn Lys Val Phe Asn Ser Pro Thr  
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195 200 205

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210 215 220

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Asn Pro Glu Phe Gly Cys Phe Val Thr Ala Lys Ile Pro Ser Met Trp  
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275

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Pro Glu Asp Ile Lys Glu Leu Asn Gly Pro His Cys Val Ser Met Tyr  
325 330 335

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340 345 350

Glu Asp Met Arg Tyr Val Cys Glu Val Gln Pro Cys Ser Ala Ser Asn  
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US seq list.ST25.txt

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US seq list.ST25.txt

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US seq list.ST25.txt

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 <213> Necator americanus

<400> 10

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Met Leu Arg Ala Gly Thr Trp Glu Thr Tyr Val Glu Gly Met Arg Lys  
 35 40 45

Arg Gln Leu Gln Leu Leu Lys Glu His Lys Val His Ile Gln Asp Val  
 50 55 60

Leu Gly Tyr Ala Asn Met Glu Tyr Leu Gly Glu Ile Thr Ile Gly Thr  
 65 70 75 80

Pro Gln Gln Lys Phe Leu Val Val Leu Asp Thr Gly Ser Ser Asn Leu  
 85 90 95

Trp Val Pro Asp Asp Ser Cys Tyr Lys Glu Lys Arg Pro Asp Arg Cys  
 100 105 110

Leu Val Ser Asn Cys Asp Ala Gly Leu Val Cys Gln Val Phe Cys Pro  
 115 120 125

Asp Pro Lys Cys Cys Glu His Thr Arg Glu Phe Lys Gln Val Asn Ala  
 130 135 140

Cys Lys Asp Lys His Arg Phe Asp Gln Lys Asn Ser Asn Thr Tyr Val  
 145 150 155 160

Lys Thr Asn Lys Thr Trp Ala Ile Ala Tyr Gly Thr Gly Asp Ala Arg  
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Gly Phe Phe Gly Arg Asp Thr Val Arg Leu Gly Ala Glu Gly Lys Asp  
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US seq list.ST25.txt

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Glu Phe Phe Ser Asn Thr Phe Leu Asp Gly Ile Leu Gly Leu Ala Phe  
210 215 220

Gln Glu Leu Ser Glu Gly Gly Val Ala Pro Pro Ile Ile Arg Ala Ile  
225 230 235 240

Asp Leu Gly Leu Leu Asp Gln Pro Ile Phe Thr Val Tyr Phe Glu Asn  
245 250 255

Val Gly Asp Lys Glu Gly Val Tyr Gly Gly Val Phe Thr Trp Gly Gly  
260 265 270

Leu Asp Pro Asp His Cys Glu Asp Glu Val Thr Tyr Glu Gln Leu Thr  
275 280 285

Glu Ala Thr Tyr Trp Gln Phe Arg Leu Lys Gly Val Ser Ser Lys Asn  
290 295 300

Phe Ser Ser Thr Ala Gly Trp Glu Ala Ile Ser Asp Thr Gly Thr Ser  
305 310 315 320

Leu Asn Gly Ala Pro Arg Gly Ile Leu Arg Ser Ile Ala Arg Gln Tyr  
325 330 335

Asn Gly Gln Tyr Val Ala Ser Gln Gly Leu Tyr Val Val Asp Cys Ser  
340 345 350

Lys Asn Val Thr Val Asp Val Thr Ile Gly Asp Arg Asn Tyr Thr Met  
355 360 365

Thr Ala Lys Asn Leu Val Leu Glu Ile Gln Ala Asp Ile Cys Ile Met  
370 375 380

Ala Phe Phe Glu Met Asp Met Phe Ile Gly Pro Ala Trp Ile Leu Gly  
385 390 395 400

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US seq list.ST25.txt

<213> Ancylostoma caninum

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Gln Ser Gln Phe Val Thr His Ala Lys Val Thr Lys Lys Arg Ile Asp  
35 40 45  
Gly Tyr Phe Ile Tyr Tyr Asp Leu Glu His Lys Glu Val Tyr Lys Pro  
50 55 60  
Lys Asp Arg Ser Ile Pro Ile Glu Leu Phe Ser Trp Arg Glu Lys Glu  
65 70 75 80  
Asn Cys Gly Met Pro Asp Leu Glu Glu Gly Lys Glu Tyr Leu Ile Gly  
85 90 95  
Gly Lys Val Thr Asp Tyr Gly Asp Gly Asp Leu Val Ile Ser Val Ser  
100 105 110  
Arg Cys Asp Leu Leu Arg Asn Trp Thr Asp Val Ser Gly Glu Glu Lys  
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US seq list.ST25.txt

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US seq list.ST25.txt

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<213> Ancylostoma caninum

<400> 14

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Leu Asn Glu Asn Lys Asp Asp Ser Ser Pro Ala Pro Lys Ile Trp Asn  
35 40 45

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Val Asp Glu Gln Thr Val Arg Gln Ser Ser Val Met Lys Leu Arg Asn  
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US seq list.ST25.txt

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100 105 110

Pro Leu Arg Val Asn Asp Pro Lys Tyr Cys Pro Ser Tyr Gly Glu Pro  
115 120 125

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130 135 140

Leu Asp Gln Thr Val Asp Pro Cys Glu Asp Leu Tyr Ala Phe Thr Cys  
145 150 155 160

Asn Thr Tyr Leu Arg Asn His Asn Ala Thr Asp Ile Gly Val Asn Arg  
165 170 175

Ile Gly Thr Tyr Lys Asp Ala Gln Asp Asp Val Asn Ala Glu Ile Val  
180 185 190

Glu Ala Leu Glu Glu Val Asn Val Ser Asp Thr Lys Trp Ser Glu Thr  
195 200 205

Glu Arg Leu Val Lys Ala Thr Leu Phe Thr Cys Val His His Thr Arg  
210 215 220

Ala Arg Lys Pro Ile Asp Asn Ser Lys Asn Val Leu Ile Glu Met Arg  
225 230 235 240

Asp Leu Phe Gly Gly Ile Pro Phe Leu Asn His Thr Leu Lys Lys Asp  
245 250 255

Ile Asp Phe Phe Asp Ile Met Gly Lys Phe Glu Gln Asn His Ala Met  
260 265 270

Gly Thr Leu Leu Gly Ala Met Val Ser Val Asp Phe Lys Asn Val Asn  
275 280 285

Lys His Ser Leu Phe Leu Ser Gln Pro Tyr Leu Pro Met Ala Arg Asp  
290 295 300

Phe Tyr Val Phe Pro Gln His Thr Lys Met Val Glu Asn Arg Val Ser  
305 310 315 320

Leu Ile Asn Ser Val Leu Arg Ser Phe Ala Glu Ala Val Leu Asp Asp  
325 330 335

Pro Ser Pro Tyr Leu Asp Leu Met Ser Arg Ser Ala Arg Asp Val Val

340

Lys Leu Glu Met Gln Ile Ala Met Ala Ser Trp Pro Glu Ser Glu Leu  
355 360 365

Arg Asn Tyr Ala Gln Gln His Asn Pro Arg Thr Leu Asn Gln Leu Lys  
370 375 380

Ala Ala Tyr Pro Ala Ile Lys Trp Asp Ser Tyr Phe Asn Ala Leu Leu  
385 390 395 400

Ser Ser Val Gln Gly Val Asp Met Asn Arg Gln Asn Ile Ile Leu Thr  
405 410 415

Gln Pro Ser Tyr Phe Gly Trp Leu Asn Ala Leu Phe Asn Gly Gly Ala  
420 425 430

Asp Asp Lys Thr Ile Ala Asn Tyr Leu Leu Val His Leu Ile Leu Glu  
435 440 445

Glu Ala Asp Phe Leu Gly Gly Ala Leu Lys Thr Met Val Gln Lys Ser  
450 455 460

Asp Tyr Val Pro Tyr Ala Leu Gly Arg Gly Lys Gly Val Thr Arg Val  
465 470 475 480

Gly Gln Gln Leu Thr Arg Ser His Asp Asp Thr Val Glu Asp Ala Asn  
485 490 495

Ile Gln Cys Leu Asn Ser Met Met Thr Tyr Met Pro Phe Gly Pro Gly  
500 505 510

Tyr Val Tyr Val Lys Ser Arg Lys Asn Arg Asp Asp Val Val Lys Asp  
515 520 525

Ile Glu His Gln Thr Glu Leu Val Phe Lys Asn Phe Val Asn Met Ile  
530 535 540

Gly Asn Leu Asn Trp Met Thr Asp Ala Ser Leu Glu Leu Ala Met Glu  
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Lys Ala Asp Thr Met Val Lys Asn Tyr Gly Trp Pro Lys Asp Leu Phe  
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Gly Asn Phe Arg Asp Ser Ser Lys Ile Asp Ala Tyr His Lys Lys Asp  
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US seq list.ST25.txt

Tyr Gly Asn Ile Ile Asn Leu Tyr Lys Glu Asn Ile Thr His Asn Tyr  
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610 615 620

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Pro Ala Leu Val Asn Ala Trp Tyr Ile Pro Glu Arg Asn Ser Ile Ala  
645 650 655

Phe Pro Tyr Ala Phe Trp Asn Pro Pro Tyr Tyr Asn Tyr Glu Tyr Pro  
660 665 670

Gln Ala Cys Asn Tyr Ala Gly Gln Gly Gly Thr Ala Gly His Glu Leu  
675 680 685

Val His Gly Phe Asp Asp Gln Gly Val Gln Phe Ala Ala Asp Gly Ser  
690 695 700

Leu Ser Asp Cys Thr Trp Ile Glu Cys Gly Trp Leu Glu Glu Lys Ser  
705 710 715 720

Lys Lys Gly Phe Ser Asp Met Ala Gln Cys Val Val Thr Gln Tyr Ser  
725 730 735

Thr Gln Cys Cys Pro Gln Thr Gly Gly Val Thr His Cys Ala Asn Gly  
740 745 750

Ala Thr Thr Gln Gly Glu Asn Ile Ala Asp Leu Gly Gly Gln Leu Ala  
755 760 765

Ala Tyr Arg Ala Tyr Arg Glu Tyr Ile Thr Lys Glu Arg Gly Glu Glu  
770 775 780

Glu Lys Arg Leu Pro Gly Leu Glu Gln Tyr Thr Pro Asn Gln Ile Phe  
785 790 795 800

Trp Ile Thr Tyr Gly Tyr Ser Trp Cys Met Ser Gln Thr Asp Ser Ser  
805 810 815

Leu Ile Arg Gln Leu Leu Thr Asp Val His Ser Pro Gly Ser Cys Arg  
820 825 830

Val Asn Gln Val Met Gln Asp Ile Pro Glu Phe Ala Leu Asp Phe Gly  
835 840 845

US seq list.ST25.txt

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Val Trp Val Ala Glu  
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US seq list.ST25.txt

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 <211> 536  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 16

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 35 40 45

Lys Phe Ile Arg Leu Arg Glu Lys Ile Lys Ala Lys Leu Thr Leu Ser  
 50 55 60

Pro Ala Arg Lys Ala Ile Leu Asp Glu Val Met Lys His Ile Lys Met  
 65 70 75 80

Ile Lys Lys Asp Lys Ile Gln Glu Lys Gly Asp Ser Ile Asp Glu Ile  
 85 90 95

Asn Glu Lys Ser Ala Ile Gly Gln Leu Leu Tyr Gln Gly Asp Ile Val  
 100 105 110

Leu Thr Glu Lys Gln Ala Gln Gln Ile Thr Glu Asp Ile Glu Asn Asp  
 115 120 125

Lys Gly Asp Arg Glu Lys Arg Gln Ala Phe Arg Asp Arg Asn Tyr Pro  
 130 135 140

Arg Thr Leu Trp Ser Lys Gly Val Tyr Phe His Phe His Arg Asn Ala  
 145 150 155 160

Thr Pro Glu Val Arg Ser Val Phe Val Lys Gly Ala Lys Leu Trp Met  
 165 170 175

Lys Asp Thr Cys Ile Asp Phe Phe Glu Ser Asn Ser Ala Pro Asp Arg  
 Page 23

180

185

190

Ile Arg Val Phe Lys Glu Asn Gly Cys Trp Ser Tyr Val Gly Arg Leu  
 195 200 205

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 210 215 220

Thr Ala Ala His Glu Ile Gly His Ala Ile Gly Phe Tyr His Thr His  
 225 230 235 240

Ala Arg His Asp Arg Asp Asn Phe Ile Thr Phe Asn Ala Gln Asn Val  
 245 250 255

Lys Pro Asp Trp Leu Asp Gln Phe Thr Leu Gln Thr Pro Ala Thr Asn  
 260 265 270

Glu Asn Tyr Gly Ile Thr Tyr Asp Tyr Gly Ser Ile Met His Tyr Gly  
 275 280 285

Ala Asn Ser Ala Ser Gln Asn Gly Arg Pro Thr Met Val Pro His Asp  
 290 295 300

Pro Lys Tyr Val Glu Thr Leu Gly Ile Asn Lys His Tyr Asp Cys Thr  
 305 310 315 320

Lys Asn Cys Asp Pro Ala Thr Ser Ala Gln Cys Lys Met Gly Gly Phe  
 325 330 335

Pro His Pro Arg Asp Cys Thr Arg Cys Ile Cys Pro Ser Gly Tyr Gly  
 340 345 350

Gly Lys Leu Cys Asp Gln Lys Pro Ala Gly Cys Gly Ser Ile Tyr Gln  
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 370 375 380

Ala Gly Gln Arg Pro Arg Glu Asp Met Asp Phe Cys Tyr Tyr Trp Ile  
 385 390 395 400

Thr Ala Pro Lys Gly Ser Lys Ile Glu Ile Lys Ile Ala Gly Leu Ser  
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Gln Gly Ala Ala Val Glu Gly Cys Gln Tyr Trp Gly Val Glu Ile Lys  
 420 425 430

US seq list.ST25.txt

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435 440 445

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450 455 460

Thr Tyr Asn Ile Phe Tyr Ala Thr Tyr Val Asp Ile Gln Tyr Arg Ile  
465 470 475 480

Val Gly Asp Asn Val Gly Gly Pro Met Pro Gln Pro Gln Pro Asn Ser  
485 490 495

Asn Cys Val Asp Asn Glu Gln Cys Ala Thr Leu Val Arg Thr Lys Asn  
500 505 510

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530 535

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<211> 1328  
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<213> Ancylostoma caninum

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US seq list.ST25.txt

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<213> Ancylostoma caninum

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<400> 18

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1          5          10          15

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Asp Ala Ser Pro Ala Arg Asp Gly Phe Gly Cys Ser Asn Ser Gly Ile
          20          25          30

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```

Thr Asp Lys Asp Arg Gln Ala Phe Leu Asp Phe His Asn Asn Ala Arg
          35          40          45

```

```

Arg Arg Val Ala Lys Gly Val Glu Asp Ser Asn Ser Gly Lys Leu Asn
          50          55          60

```

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Pro Ala Lys Asn Met Tyr Lys Leu Ser Trp Asp Cys Ala Met Glu Gln
          65          70          75          80

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Gln Leu Gln Asp Ala Ile Gln Ser Cys Pro Ser Ala Phe Ala Gly Ile
          85          90          95

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```

Gln Gly Val Ala Gln Asn Val Met Ser Trp Ser Ser Ser Gly Gly Phe
          100          105          110

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Pro Asp Pro Ser Val Lys Ile Glu Gln Thr Leu Ser Gly Trp Trp Ser
          115          120          125

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Gly Ala Lys Lys Asn Gly Val Gly Pro Asp Asn Lys Tyr Asn Gly Gly
          130          135          140

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Gly Leu Phe Ala Phe Ser Asn Met Val Tyr Ser Glu Thr Thr Lys Leu
          145          150          155          160

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US seq list.ST25.txt

Gly Cys Ala Tyr Lys Val Cys Gly Thr Lys Leu Ala Val Ser Cys Ile  
165 170 175

Tyr Asn Gly Val Gly Tyr Ile Thr Asn Gln Pro Met Trp Glu Thr Gly  
180 185 190

Gln Ala Cys Lys Thr Gly Ala Asp Cys Ser Thr Tyr Lys Asn Ser Gly  
195 200 205

Cys Glu Asp Gly Leu Cys Thr Lys Gly Pro Asp Val Pro Glu Thr Asn  
210 215 220

Gln Gln Cys Pro Ser Asn Thr Gly Met Thr Asp Ser Val Arg Asp Thr  
225 230 235 240

Phe Leu Ser Val His Asn Glu Phe Arg Ser Ser Val Ala Arg Gly Leu  
245 250 255

Glu Pro Asp Ala Leu Gly Gly Asn Ala Pro Lys Ala Ala Lys Met Leu  
260 265 270

Lys Met Val Tyr Asp Cys Glu Val Glu Ala Ser Ala Ile Arg His Gly  
275 280 285

Asn Lys Cys Val Tyr Gln His Ser His Gly Glu Asp Arg Pro Gly Leu  
290 295 300

Gly Glu Asn Ile Tyr Lys Thr Ser Val Leu Lys Phe Asp Lys Asn Lys  
305 310 315 320

Ala Ala Lys Gln Ala Ser Gln Leu Trp Trp Asn Glu Leu Lys Glu Phe  
325 330 335

Gly Val Gly Pro Ser Asn Val Leu Thr Thr Ala Leu Trp Asn Arg Pro  
340 345 350

Gly Met Gln Ile Gly His Tyr Thr Gln Met Ala Trp Asp Thr Thr Tyr  
355 360 365

Lys Leu Gly Cys Ala Val Val Phe Cys Asn Asp Phe Thr Phe Gly Val  
370 375 380

Cys Gln Tyr Gly Pro Gly Gly Asn Tyr Met Gly His Val Ile Tyr Thr  
385 390 395 400

Met Gly Gln Pro Cys Ser Gln Cys Ser Pro Gly Ala Thr Cys Ser Val  
Page 27

405

US seq list.ST25.txt  
410

415

Thr Glu Gly Leu Cys Ser Ala Pro  
420

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 <211> 767  
 <212> DNA  
 <213> Ancylostoma caninum

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 cgggaaatgc tccgaaggct gccaaaatga agaaaatgat ctacgactgc aacgtcgaat 240  
 caactgcaat gcaaaatgcg aaaaaatgtg ttttcgccca ttcgcacagg aaggaggattg 300  
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 ctagtgacgg ttggttcagt gagcttgca agtatggtgt aggccaggaa aacaagctaa 420  
 caacgcagtt gtggaacagg ggagttatga taggacatta cactcagatg gtctggcagg 480  
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 caaaagactc tgactgtggc tcgaacgcc gttgcagcgc tggggaggcg ctttgcgtcg 660  
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 <212> PRT  
 <213> Ancylostoma caninum

&lt;400&gt; 20

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 20 25 30

Gln Lys Phe Leu Asp Val His Asn Ser Tyr Arg Ser Met Val Ala Lys  
 35 40 45

Gly Gln Ala Lys Asp Ala Ile Ser Gly Asn Ala Pro Lys Ala Ala Lys  
 50 55 60



US seq list.ST25.txt

Met Lys Lys Met Ile Tyr Asp Cys Asn Val Glu Ser Thr Ala Met Gln  
65 70 75 80

Asn Ala Lys Lys Cys Val Phe Ala His Ser His Arg Lys Gly Val Gly  
85 90 95

Glu Asn Ile Trp Met Ser Thr Ala Arg Gln Met Asp Lys Ala Gln Ala  
100 105 110

Ala Gln Gln Ala Ser Asp Gly Trp Phe Ser Glu Leu Ala Lys Tyr Gly  
115 120 125

Val Gly Gln Glu Asn Lys Leu Thr Thr Gln Leu Trp Asn Arg Gly Val  
130 135 140

Met Ile Gly His Tyr Thr Gln Met Val Trp Gln Glu Ser Tyr Lys Leu  
145 150 155 160

Gly Cys Tyr Val Glu Trp Cys Ser Ser Met Thr Tyr Gly Val Cys Gln  
165 170 175

Tyr Ser Pro Gln Gly Asn Asn Met Asn Ser Leu Thr Tyr Glu Lys Gly  
180 185 190

Asn Pro Cys Thr Lys Asp Ser Asp Cys Gly Ser Asn Ala Ser Cys Ser  
195 200 205

Ala Gly Glu Ala Leu Cys Val Val Arg Gly  
210 215

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<211> 687  
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<213> Ancylostoma caninum

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aagttacgga catgcacaac gcctacagat ccaaattcgc acgggatcat caagcttcga 180  
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aaagtcatgc gaaacttggg tgcgcagttg ttgagtgtc caagaaaacc catgtagtct 480  
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US seq list.ST25.txt

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caattacaaa aaaaaaaaaa aaaaaaa 687

<210> 22  
<211> 200  
<212> PRT  
<213> Ancylostoma caninum

<400> 22

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Ala Asp Ala Asp Tyr Ser Lys Cys Pro Gln Asn Glu Ile Met Asn Asn  
20 25 30

Asp Met Arg Glu Lys Val Thr Asp Met His Asn Ala Tyr Arg Ser Lys  
35 40 45

Phe Ala Arg Asp His Gln Ala Ser Lys Met Arg Lys Leu Val Tyr Asp  
50 55 60

Cys Ala Ile Glu Lys Gly Ile Tyr Glu Ser Asp Thr Lys Cys Glu Met  
65 70 75 80

Lys Pro Ser Met Glu Glu Glu Asn Val Glu Val Ile Asp Gly Asn Ser  
85 90 95

Asp Asp Leu Thr Val Ile Ser Glu Ala Gly Asn Ser Trp Trp Ser Glu  
100 105 110

Ile Leu Asp Leu Lys Gly Lys Asp Val Tyr Asn Ser Val Asp Asn Thr  
115 120 125

Asp Glu Ile Ala Asn Met Ala Trp Glu Ser His Ala Lys Leu Gly Cys  
130 135 140

Ala Val Val Glu Cys Ser Lys Lys Thr His Val Val Cys Arg Tyr Gly  
145 150 155 160

Pro Glu Gly Lys Gly Glu Gly Lys Lys Ile Tyr Glu Lys Gly Glu Thr  
165 170 175

Cys Ser Gln Cys Ser Asp Tyr Gly Gln Gly Val Thr Cys Asp Asn Asp  
180 185 190

## US seq list.ST25.txt

Glu Trp Glu Gly Leu Leu Cys Ser  
195 200

<210> 23  
<211> 1689  
<212> DNA  
<213> Ancylostoma caninum

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agaatacaat cgacaacaat gttcttaagc cgataaatac tcgtcgagag gctctggcca 180  
agggcacgca acagaatggc tttgacccac caaacccaca aacattcttg ccaccagcga 240  
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caaagctagt cacgttctac tgtattttga atggaaaaaa tatcaccaac ggagaggctc 660  
tctataaggg cacaactgtg aataccggag gatgcaaaga ggtcacatgc tcagcgggat 720  
atgcctgtaa caacgccacc ttgctatgtg aacgtagtgc gacaacaagc tcatctacat 780  
cggcaagcac atcttcatca acagcttcct caacaagttc atctatggca ataagcacat 840  
cttcgtcaac aagcgcattt ggggcaacaa caacaaaagc tccttctccg caagcgcaat 900  
tccccacagg gactagcact atgtgcaata ccaggcatgc ctatgctaac aggatgaccg 960  
acaatctcag gaatgaatac gtaaggctgc acaacttccg aagaggctta ctcgcaaagg 1020  
gagaaattcc tcagaagggt aacatatacc taccaaaggc ggctgacatg tggaaaatta 1080  
gttacgactg cggcctggaa caaggagcca tagaacacgc aagccagtgt ctcacaggag 1140  
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ctgttttgaa tttttgaata ttacattaat ggatgttaac aatgggtcct ttagttttct 1620

US seq list.ST25.txt

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 aaaaaaaaaa 1689

<210> 24  
 <211> 508  
 <212> PRT  
 <213> Ancylostoma caninum  
 <400> 24

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 20 25 30  
 Pro Asn Gly Tyr Leu His Lys Asn Thr Ile Asp Asn Asn Val Leu Lys  
 35 40 45  
 Pro Ile Asn Thr Arg Arg Glu Ala Leu Ala Lys Gly Thr Gln Gln Asn  
 50 55 60  
 Gly Phe Asp Pro Pro Asn Pro Gln Thr Phe Leu Pro Pro Ala Thr Asp  
 65 70 75 80  
 Met Thr Lys Leu Ser Trp Ser Cys Asp Leu Glu Gln Lys Ala Ile Lys  
 85 90 95  
 Thr Ile Asn Gly Asn Cys Val Asn Pro Ala Asn Pro Thr Lys Pro Asn  
 100 105 110  
 Asn Gly Glu Gly Leu Ala Asp Val Leu Tyr Tyr Gly Asn Asp Tyr Asp  
 115 120 125  
 Asn Thr Val Glu Gly Val Ile Gln Gly Asn Leu Glu Ala Trp Leu Val  
 130 135 140  
 Lys Ala Asp Phe Asn Val Phe Pro Val Thr Thr Lys Gly Thr Val Ile  
 145 150 155 160  
 Ser Tyr Pro Thr Tyr Asn Gly Asn Thr Asp Leu Leu Ala Tyr Ser Asn  
 165 170 175  
 Leu Val Arg Pro Thr Asn Thr Glu Ile Gly Cys Val Leu Glu Arg Cys  
 180 185 190  
 Pro Ala Thr Ala Asn Val Pro Lys Leu Val Thr Phe Tyr Cys Ile Leu  
 195 200 205

US seq list.ST25.txt

Asn Gly Lys Asn Ile Thr Asn Gly Arg Ala Leu Tyr Lys Gly Thr Thr  
 210 215 220  
 Val Asn Thr Gly Gly Cys Lys Glu Val Thr Cys Ser Ala Gly Tyr Ala  
 225 230 235 240  
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 245 250 255  
 Ser Thr Ser Ala Ser Thr Ser Ser Ser Thr Ala Ser Ser Thr Ser Ser  
 260 265 270  
 Ser Asn Ala Ile Ser Thr Ser Ser Ser Thr Ser Ala Ser Gly Ala Thr  
 275 280 285  
 Thr Thr Lys Ala Pro Ser Pro Gln Ala Gln Phe Pro Thr Gly Thr Ser  
 290 295 300  
 Thr Met Cys Asn Thr Arg His Ala Tyr Ala Asn Arg Met Thr Asp Asn  
 305 310 315 320  
 Leu Arg Asn Glu Tyr Val Arg Leu His Asn Phe Arg Arg Gly Leu Leu  
 325 330 335  
 Ala Lys Gly Glu Ile Pro Gln Lys Gly Asn Ile Tyr Leu Pro Lys Ala  
 340 345 350  
 Ala Asp Met Trp Lys Ile Ser Tyr Asp Cys Gly Leu Glu Gln Gly Ala  
 355 360 365  
 Ile Glu His Ala Ser Gln Cys Leu Thr Gly Gly Ser Gly Gln Ser Ser  
 370 375 380  
 Arg Pro Gly Val Gly Glu Asn Phe Lys Val Ile Pro Ala Ala Arg Phe  
 385 390 395 400  
 Pro Thr Phe Glu Asp Ala Ala Lys Lys Thr Val Thr Glu Trp Trp Lys  
 405 410 415  
 Pro Ile Arg Asn Val Asp Tyr Phe Gly Asn Asn Val Asn Phe Leu Pro  
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 435 440 445  
 Thr Thr Asn Lys Val Gly Cys Ser Ile Val Lys Cys Thr Thr Asp Asn

US seq list.ST25.txt  
460

450

455

Val Tyr Val Gly Val Cys Arg Tyr Ser Pro Met Gly Asn Ile Val Asn  
465 470 475 480

Ser Asn Ile Tyr Gln Ile Gly Asn Pro Cys Ser Val Arg Pro Thr Gln  
485 490 495

Ala Thr Gly Cys Asp Pro Val Glu Gly Leu Trp Tyr  
500 505

<210> 25  
<211> 1384  
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<213> Ancylostoma caninum

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ctaacagatg ctgaacgcac actgctaact agggcgcaca attccattcg acgggaaata 180  
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gtctgtagat acaaagctgc cggaaacatc gtgggcgaat tcattctatac caagggaat 1260

US seq list.ST25.txt

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 ttttcactgg actgtttcac gaacagatca gataaatcgt ttcatcaaaa aaaaaaaaaa 1380  
 aaaa 1384

<210> 26  
 <211> 424  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 26

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 20 25 30

Leu Leu Thr Arg Val His Asn Ser Ile Arg Arg Glu Ile Ala Gln Gly  
 35 40 45

Val Ala Asn Asn Tyr His Gly Gly Lys Leu Pro Ala Gly Lys Asn Ile  
 50 55 60

Tyr Arg Met Arg Tyr Ser Cys Glu Leu Glu Gln Ala Ala Ile Asp Ala  
 65 70 75 80

Ser Gln Thr Phe Cys Ser Ala Ser Leu Glu Glu Pro Gln Lys Tyr Gly  
 85 90 95

Gln Asn Ile Gln Ala Tyr Val Thr Pro Ser Ile Ile Ala Arg Pro Lys  
 100 105 110

Asn Asp Leu Leu Glu Asp Ala Val Lys Gln Trp Tyr Leu Pro Val Ile  
 115 120 125

Tyr Tyr Gly Gln Arg Asp Ala Ala Asn Lys Phe Thr Asp Pro Arg Leu  
 130 135 140

Tyr Thr Phe Ala Asn Leu Ala Tyr Asp Lys Asn Thr Ala Leu Gly Cys  
 145 150 155 160

His Tyr Ala Lys Cys Gln Gly Pro Asp Arg Ile Val Ile Ser Cys Met  
 165 170 175

Tyr Asn Asn Val Val Pro Asp Asn Ala Val Ile Tyr Glu Pro Gly Thr  
 180 185 190

Ala Cys Val Lys Asp Ala Asp Cys Thr Thr Tyr Pro Gln Ser Thr Cys  
 Page 35

195

200

205

Lys Asp Ser Leu Cys Ile Ile Pro Thr Pro His Pro Pro Asn Pro Pro  
 210 215 220

Asn Pro Pro Pro Ala Met Ser Pro Asn Ala Glu Met Thr Asp Ala Ala  
 225 230 235 240

Arg Lys Lys Val Leu Gly Met His Asn Trp Arg Arg Ser Gln Val Ala  
 245 250 255

Leu Gly Asn Val Gln Asn Gly Lys Asn Ala Tyr Asn Cys Pro Thr Ala  
 260 265 270

Thr Asp Met Tyr Lys Ile Glu Tyr Asp Cys Asp Leu Glu Asn Ser Ala  
 275 280 285

Leu Ala Tyr Ala Lys Gln Cys Ser Leu Val Gly Ser Ala Glu Gly Thr  
 290 295 300

Arg Pro Gly Glu Gly Glu Asn Val His Lys Gly Ala Leu Val Thr Asp  
 305 310 315 320

Pro Glu Ala Ala Val Gln Thr Ala Val Gln Ala Trp Trp Ser Gln Ile  
 325 330 335

Ser Gln Asn Gly Leu Asn Ala Gln Met Lys Phe Thr Ala Phe Leu Lys  
 340 345 350

Asp Lys Pro Asp Ala Pro Thr Ala Phe Thr Gln Met Ala Trp Ala Lys  
 355 360 365

Ser Val Lys Leu Gly Cys Ala Val Ser Asn Cys Gln Ala Asp Thr Phe  
 370 375 380

Thr Val Cys Arg Tyr Lys Ala Ala Gly Asn Ile Val Gly Glu Phe Ile  
 385 390 395 400

Tyr Thr Lys Gly Asn Val Cys Asp Ala Cys Lys Ala Thr Cys Ile Thr  
 405 410 415

Ala Glu Gly Leu Cys Pro Thr Pro  
 420

&lt;210&gt; 27

&lt;211&gt; 1467

&lt;212&gt; DNA

&lt;213&gt; Ancylostoma caninum



US seq list.ST25.txt

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caaatccatt aacaacctaa ggaagaaaat cgccgatgga tcagcggaaa acaaatcagg    180
aaagtgcccg cagggcaaga atatctacaa gctaagctgg gattgtgaat tggaactgaa    240
agcacagcaa gctgtagacc agtgcaaacc gaatgtaccc gaacccgcag gatattcgca    300
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aaaaaaaaaa aaaaaaaaaa aaaaaaaa                                1467

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<210> 28
<211> 451
<212> PRT
<213> Ancylostoma caninum

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<400> 28

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1           5           10          15

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US seq list.ST25.txt

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20 25 30

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35 40 45

Gly Ser Ala Glu Asn Lys Ser Gly Lys Cys Pro Gln Gly Lys Asn Ile  
50 55 60

Tyr Lys Leu Ser Trp Asp Cys Glu Leu Glu Leu Lys Ala Gln Gln Ala  
65 70 75 80

Val Asp Gln Cys Lys Pro Asn Val Pro Glu Pro Ala Gly Tyr Ser Gln  
85 90 95

Ile Leu Lys Lys Val Lys Ser Thr Cys Asp Pro Thr Lys Val Leu Lys  
100 105 110

Lys Gln Ile Glu Ala Trp Trp Thr Lys Ser Val Lys Asp Ala Gly Val  
115 120 125

Asp Asn Pro Pro Asn Asn Lys Gln Gly Leu Glu Asp Phe Ala Lys Leu  
130 135 140

Ala Asn Gly Lys Ala Thr Lys Ile Gly Cys Ala Gln Lys Asn Cys Asn  
145 150 155 160

Glu Gln Leu Tyr Val Ala Cys Val Ile Asn Glu Pro Ala Pro Ala Val  
165 170 175

Gly Met Pro Ile Tyr Glu Val Gly Ala Gly Cys Asn Ser Lys Asp Asp  
180 185 190

Cys Thr Thr Tyr Leu Gln Ser Lys Cys Ser Asn Lys Val Cys Val Ala  
195 200 205

Gly His Pro Gly Asp Ala Thr Thr Thr Thr Ser Thr Pro Ala Thr Thr  
210 215 220

Ala Pro Thr Thr Pro Thr Ile Pro Ala Gly Pro Thr Thr Ala Pro Ala  
225 230 235 240

Pro Pro Pro Thr Thr Ala Ala Pro Thr Thr Thr Ser Thr Ile Gly Ser  
245 250 255

Ile Asp Asn Thr Ile Cys Pro Gln Asn Gln Val Ile Thr Asp Ser Val  
260 265 270

US seq list.ST25.txt

Arg Leu Thr Phe Leu Asn Thr His Asn Gly Leu Arg Ser Gln Leu Ala  
275 280 285

Gln Gly Gln Ile Phe Met Gly Asn Gly Ala Arg Ala Arg Pro Ala Ser  
290 295 300

Lys Met Arg Arg Met Val Tyr Asn Cys Asp Ala Glu Ser Ser Ala Arg  
305 310 315 320

Asn Ser Ala Ala Gln Cys Leu Ser Ser Pro Gly Ser Pro Ser Gly Tyr  
325 330 335

Thr Glu Asn Leu His Val Ile Asn Asn Asn Phe Val Asp His Asn Ser  
340 345 350

Ala Ala Thr Gln Ala Phe Asn Ala Trp Trp Ser Glu Ile Asn Thr Gly  
355 360 365

Tyr Met Arg Gln Ala Glu Thr Glu Arg Asn Met Tyr Ser Leu Ser Val  
370 375 380

Gly Ile Pro Asn Phe Ala Lys Met Ala Trp Glu Thr Asn Ala His Leu  
385 390 395 400

Gly Cys Ala Ile Val Arg Cys Gly Leu Asn Thr Asn Val Val Cys Pro  
405 410 415

Tyr Ser Pro Lys Ser Asp Gly Gly Gln Ile Tyr Lys Met Gly Pro Phe  
420 425 430

Cys Arg Arg Cys Pro Asp Tyr Pro Gly Thr Phe Cys Asn Gln Gly Leu  
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<212> DNA  
<213> Ancylostoma caninum

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ccagctgcga acgtcagagt aaagtatatg gaggaagaca caggaccaga tccagatgac 180  
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US seq list.ST25.txt

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<210> 30  
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Pro Ala Ala Asn Val Arg Val Lys Leu Trp Glu Glu Asp Thr Gly Pro  
 35 40 45

Asp Pro Asp Asp Leu Leu Asp Ala Gly Tyr Thr Asn Ser Asn Gly Glu  
 50 55 60

Phe Gln Leu Gln Gly Gly Thr Ile Glu Thr Thr Pro Ile Asp Pro Val  
 65 70 75 80

Leu Lys Ile Tyr His Asp Cys Asn Asp Val Thr Gly Phe Leu Ser Val  
 85 90 95

Pro Lys Pro Gly Ser Arg Lys Val Arg Phe Ser Leu Pro Asp Lys Tyr  
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Ile Ser Asp Gly Met Val Pro Lys Lys Val Met Asp Ile Gly Val Ile  
 115 120 125

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US seq list.ST25.txt

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tggccaatga tgctcagaag aagacgttat cacaggtgga caactacctc aacgaagtgc    300
aacagttcgg tgaacaggta agcaaagaag gctcggcgaa gttcgaggag aacaagggca    360
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gttagtagat gagacataat ttccatccgt ccacatactc tacttctatc tatggtcaat    780
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<210> 32
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<212> PRT
<213> Ancylostoma caninum

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<400> 32

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Asn Phe Phe Thr Asn Gln Phe Asn Asn Val Lys Asp Leu Phe Ala Gly
          35          40          45

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Asn Gln Ser Glu Leu Glu Lys Asn Ile Asn Arg Val Lys Asp Leu Leu
          50          55          60

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Thr Ala Val Lys Glu Lys Ala Lys Met Leu Glu Pro Met Ala Asn Asp
65          70          75          80

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Ala Gln Lys Lys Thr Leu Ser Gln Val Asp Asn Tyr Leu Asn Glu Val
          85          90          95

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Gln Gln Phe Gly Glu Gln Val Ser Lys Glu Gly Ser Ala Lys Phe Glu
Page 41

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100

Glu Asn Lys Gly Lys Trp Gln Gln Met Leu Asn Asp Ile Phe Glu Lys  
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Gly Gly Leu Asp Gly Val Leu Lys Leu Leu Asn Leu Lys Ser Ala Gly  
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Thr Arg

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US seq list.ST25.txt

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Gln Val Leu Pro Thr Asp Glu Ser Gly Asn Tyr Ile Tyr Pro Val Val  
35 40 45

Gly Pro Asp Gly Ser Pro Leu Pro Thr Asp Glu His Lys Arg Pro Ile  
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His Pro Val Leu Gly Pro Asp Gly Ser Pro Leu Pro Thr Asp Glu Ser  
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US seq list.ST25.txt

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Pro Thr Asp Glu Ser Gly Asn Val Ile Tyr Pro Val Thr Lys Pro Asp  
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Gly Ser Pro Leu Pro Thr Asp Ala Ser Gly Asn Tyr Val Thr Asp Glu  
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Gly Thr Val Ile Glu Lys Asp Asp Glu Gly Arg Pro Leu Gly Pro Asp  
165 170 175

Gly Gln Val Leu Pro Thr Asp Glu Ser Gly Asn Tyr Ile Tyr Pro Val  
180 185 190

Val Gly Pro Asp Gly Ser Pro Leu Pro Thr Asp Glu Tyr Lys Arg Pro  
195 200 205

Ile His Pro Val Leu Gly Pro Asp Gly Ser Pro Leu Pro Thr Asp Glu  
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Ser Gly His Pro Leu Gly Glu Asp Gly Gln Pro Leu Pro Thr Asp Ala  
225 230 235 240

Ser Gly Val Pro Val Asp Lys Asp Gly Gln Pro Leu Pro Thr Asp Ser  
245 250 255

Ser Gly His Tyr Val Thr Val Pro Arg Glu Glu Ala Val Thr Lys Glu  
260 265 270

Leu Pro Thr Asp Glu Ser Gly Asn Val Ile Tyr Pro Val Thr Lys Pro  
275 280 285

Asp Gly Ser Pro Leu Pro Thr Asp Ala Ser Gly Asn Phe Ile Thr Glu  
290 295 300

Glu Gly Leu Ile Ile Gly Pro Asp Gly Val Ala Leu Pro Tyr Pro Arg  
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Asn Arg Thr Cys Ser Leu Lys Gln Leu Lys Met Asp Ile Leu Phe Ala  
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340 345 350



US seq list.ST25.txt

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Arg Ile Gly Leu Val Tyr Gly Ser Lys Asp Val Val Val Pro Leu Pro  
370 375 380

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385 390 395 400

Ile Glu Phe Ser Asp Asp Gly Ser Gln Asp Tyr Ile Ser Leu Tyr Gly  
405 410 415

Pro Ala Lys Gln Gln Phe Val Met Phe Pro Arg Ala Asp Ser Ala Lys  
420 425 430

Ile Ala Ile Phe Leu Ile Gln Asp Glu Ile Ser Tyr Cys Leu Ser Thr  
435 440 445

Arg Thr Leu Arg Cys Gly Cys Ala Thr Ala Val Asp Ser Asp Phe Cys  
450 455 460

Arg Arg Ile Asn Asn Val Leu Ala Asp Asp Ile Lys Val Cys Lys Val  
465 470 475 480

Pro Glu Thr Ala Val Val Pro Thr Pro Val Val His Pro Gln Gly Ser  
485 490 495

Arg Ala Val Ser Val Val Val Pro Arg Phe Phe Ser Ala Pro Pro Phe  
500 505 510

Asp Thr His Ser Pro Ser Arg Leu Thr Leu Leu Ala Asp Phe Ala Thr  
515 520 525

Glu Lys Glu Pro Leu Cys Gly Glu His Ser Phe Leu Ser Pro Gln Lys  
530 535 540

Trp Gly Lys Asn His Cys Thr Leu Arg Ile Pro Leu Ser Met Pro Gly  
545 550 555 560

Ile Asp His Lys Ser Asp Asp His Tyr Tyr Tyr Asp Asp Gln Thr Pro  
565 570 575

Leu Glu Ser Glu Tyr Ser Leu Asp Leu Phe Gly Lys Ala Glu Leu Val  
580 585 590

Arg Phe Phe Val Gln Val Asn Val Glu Arg Glu Leu Asp Leu Ala Pro  
Page 45

595

600

605

Glu Thr Val Arg Phe Ser Ser Leu Leu Arg Ser Asn Ala Ala Tyr Tyr  
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Arg Asn Ser Pro Ala Val Pro  
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 <211> 382  
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 <213> Ancylostoma caninum

<400> 36

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 20 25 30

Asp Val Val Val Gly Ile Asp Thr Ser Ile Gly Met Thr Glu Glu Gly  
 35 40 45

Val Thr Gln Val Leu Ala Asp Leu Ser Thr Val Phe Gly Asp Thr Lys  
 50 55 60

Ile Ala Gln Gly Glu Gly His His Ser Arg Ile Gly Val Val Thr Tyr  
 65 70 75 80

Gly Leu Asn Ala Glu Thr Arg Tyr Asn Leu Thr Asp Phe Lys Ser Thr  
 85 90 95

Asp Asp Met Leu Glu Ala Ile Trp Asp Ile Lys Cys Ser Asp Asp Lys  
 100 105 110

Tyr Ser Asn Leu Phe Ala Gly Leu Thr Arg Thr Gln Glu Ile Met Lys  
 115 120 125

Asn Gly Arg Gln Gly Arg Leu Arg Ala Asn Val Arg Ser Ala Ile Ile  
 130 135 140

Ile Tyr Ala Ser Asp Phe Arg Glu Gly Asp Val Asn Asp Ala Val Gln  
 145 150 155 160

Leu Ala His Gln Ile Lys Ile Gly Gly Thr Asp Ile Ile Val Val Ala  
 165 170 175

Phe Asp Gln Lys Gly Lys Val Asn Ala Leu Glu Gly Leu Gln Lys Ile  
 180 185 190

Ala Ser Pro Gly Arg Leu Phe Lys Ser Thr Thr Lys Asn Leu Val Gly  
 195 200 205

Leu Ile Gln Asp Ala Leu Cys Gln Thr Asn Cys Phe Cys Lys Lys Leu  
 Page 47

US seq list.ST25.txt  
220

210

215

Trp Thr Gln Tyr Gly Asp Gly Ser Val Lys Tyr Gly Glu Cys Leu Arg  
225 230 235 240

Ile Gly Gly Ile Asp Ala Asn Trp Leu Ala Ala Lys Lys Ala Cys Gln  
245 250 255

Arg Leu Ile Pro Gly Gly His Leu Ala Thr Glu Leu Asp Ser Tyr Lys  
260 265 270

His Asp Phe Ile Ala Arg Met Phe Lys Asp Asp Tyr Arg His Glu Pro  
275 280 285

Pro Tyr Met Tyr His Ile Gly Leu Ser Phe Asp Lys Gln Lys Asn Asp  
290 295 300

Tyr Phe Trp Glu Gln Pro Lys Asp Arg Met Pro Leu Pro Leu Lys Asp  
305 310 315 320

Ser Pro Phe Arg Tyr Trp Ser Arg Gly Phe Pro Asn Pro Arg Glu Lys  
325 330 335

Asp Thr Cys Val Leu Ala Ala Gln Thr Thr Ile Leu Ser Pro Glu Ile  
340 345 350

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355 360 365

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US seq list.ST25.txt

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 <213> Ancylostoma caninum

<400> 38

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Leu	Gly	Leu	Ser	Thr	Gly	Cys	Val	Val	Thr	Gly	Asn	Val	Leu	Tyr	Ala
	35						40					45			

Asn	Gly	Phe	Arg	Val	Arg	Glu	Ile	Thr	Pro	Ser	Glu	Gln	Gln	Glu	Leu
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Val	Lys	Tyr	Gln	Asn	Asp	Val	Ala	Glu	Tyr	Lys	Thr	Ala	Leu	Lys	Gln
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Ala	Ile	Lys	Glu	Arg	Glu	Glu	Lys	Ile	Arg	Ala	Arg	Leu	Ala	Gly	Lys
				85				90						95	

Lys	Val	Lys	Ala	Val	Glu	Ser	Thr	Asn	Gln	Glu	Asp	Leu	Pro	Lys	Pro
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Pro	Gln	Lys	Pro	Ser	Phe	Cys	Thr	Pro	Glu	Asp	Thr	Thr	Gln	Phe	Phe
		115					120					125			

Phe	Glu	Gly	Cys	Met	Ile	Gln	Asn	Asn	Lys	Ile	Tyr	Val	Gly	Asn	Thr
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US seq list.ST25.txt

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Phe Ser Gly Gly Glu Thr Ser Lys Pro Ser Thr Thr Thr Val Ala Pro  
195 200 205

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Thr Arg Ile Ile  
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<210> 39  
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<213> Ancylostoma caninum

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US seq list.ST25.txt

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<210> 40
<211> 536
<212> PRT
<213> Ancylostoma caninum
<400> 40

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Met Arg Val Leu Leu Leu Leu Leu Ser Ile Cys Ala Ser Ala
1          5          10         15

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Gly Phe Leu Asp Thr Lys Phe Gly Gln Lys Ile Lys Lys Thr Leu Asp
          20          25          30

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Lys Ile Lys Ala Val Leu Asn Gly Thr Ala Leu Ile Ala Ile Arg Glu
          35          40          45

```

```

Lys Phe Ile Arg Leu Arg Glu Lys Ile Lys Ala Lys Leu Thr Leu Ser
          50          55          60

```

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Pro Ala Arg Lys Ala Ile Leu Asp Glu Val Met Lys His Ile Lys Met
65          70          75          80

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```

Ile Lys Lys Asp Lys Ile Gln Glu Lys Gly Asp Ser Ile Asp Glu Ile
          85          90          95

```

```

Asn Glu Lys Ser Ala Ile Gly Gln Leu Leu Tyr Gln Gly Asp Ile Val
          100         105         110

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```

Leu Thr Glu Lys Gln Ala Gln Gln Ile Thr Glu Asp Ile Glu Asn Asp
          115         120         125

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Lys Gly Asp Arg Glu Lys Arg Gln Ala Phe Arg Asp Arg Asn Tyr Pro
Page 51

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US seq list.ST25.txt  
140

130

135

Arg Thr Leu Trp Ser Lys Gly Val Tyr Phe His Phe His Arg Asn Ala  
145 150 155 160

Thr Pro Glu Val Arg Ser Val Phe Val Lys Gly Ala Lys Leu Trp Met  
165 170 175

Lys Asp Thr Cys Ile Asp Phe Phe Glu Ser Asn Ser Ala Pro Asp Arg  
180 185 190

Ile Arg Val Phe Lys Glu Asn Gly Cys Trp Ser Tyr Val Gly Arg Leu  
195 200 205

Gly Gly Glu Gln Asp Leu Ser Leu Gly Glu Gly Cys Gln Ser Val Gly  
210 215 220

Thr Ala Ala His Glu Ile Gly His Ala Ile Gly Phe Tyr His Thr His  
225 230 235 240

Ala Arg His Asp Arg Asp Asn Phe Ile Thr Phe Asn Ala Gln Asn Val  
245 250 255

Lys Pro Asp Trp Leu Asp Gln Phe Thr Leu Gln Thr Pro Ala Thr Asn  
260 265 270

Glu Asn Tyr Gly Ile Thr Tyr Asp Tyr Gly Ser Ile Met His Tyr Gly  
275 280 285

Ala Asn Ser Ala Ser Gln Asn Gly Arg Pro Thr Met Val Pro His Asp  
290 295 300

Pro Lys Tyr Val Glu Thr Leu Gly Ile Asn Lys His Tyr Asp Cys Thr  
305 310 315 320

Lys Asn Cys Asp Pro Ala Thr Ser Ala Gln Cys Lys Met Gly Gly Phe  
325 330 335

Pro His Pro Arg Asp Cys Thr Arg Cys Ile Cys Pro Ser Gly Tyr Gly  
340 345 350

Gly Lys Leu Cys Asp Gln Lys Pro Ala Gly Cys Gly Ser Ile Tyr Gln  
355 360 365

Ala Thr Asn Gln Tyr Gln Thr Leu His Asp Glu Ile Gly Asp Lys Arg  
370 375 380



US seq list.ST25.txt

Ala Gly Gln Arg Pro Arg Glu Asp Met Asp Phe Cys Tyr Tyr Trp Ile  
385 390 395 400

Thr Ala Pro Lys Gly Ser Lys Ile Glu Ile Lys Ile Ala Gly Leu Ser  
405 410 415

Gln Gly Ala Ala Val Glu Gly Cys Gln Tyr Trp Gly Val Glu Ile Lys  
420 425 430

Thr His Ala Asp Gln Arg Leu Thr Gly Tyr Arg Phe Cys Ala Pro Glu  
435 440 445

Asp Val Gly Val Arg Leu Val Ser Asn Phe Asn Ile Val Pro Ile Ile  
450 455 460

Thr Tyr Asn Ile Phe Tyr Ala Thr Tyr Val Asp Ile Gln Tyr Arg Ile  
465 470 475 480

Val Gly Asp Asn Val Gly Gly Pro Met Pro Gln Pro Gln Pro Asn Ser  
485 490 495

Asn Cys Val Asp Asn Glu Gln Cys Ala Thr Leu Val Arg Thr Lys Asn  
500 505 510

Phe Cys Gln Ser Arg Phe Phe Thr Ser Ser Val Lys Arg Gly Leu Cys  
515 520 525

Pro Lys Ser Ser Gly Phe Cys Arg  
530 535

<210> 41  
<211> 850  
<212> DNA  
<213> Ancylostoma caninum

<400> 41  
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ggtcaatgct gatgaggaag acgatctacc ccgcaatcct ttgtgggacg cttacaagga 120  
tgacaatggc aaatatgtga ttccgtacgt cattaacgga agttatggag aggagaaaaa 180  
agttttatatt gaaatgatgg acgaaatcga taagaatacc tgcgtccgct tcatacccag 240  
atcgacagag caggattata tcgaaatcgt aaacagacta ggagaaggaa ccggcgctgt 300  
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tccaactcct gcgcctgtaa tgcagacttt gatgaaaatc attggcttac cacctgaaca 420  
cattcgacca gagaggaaa atcatatcaa gatacactgg gagaacatcg agaaaggtta 480  
cgaagctttc ttcgccctct cctctgttaa gcccgatccg tacggaatac catatgatta 540

US seq list.ST25.txt

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ttacaagaag atctgcacca agtataaatg cgatatctgc atgggtgaga agatgaagta	720
ttaaagaaag gaatgacgtt aacataagga atggttgccg atttcaacaa aacgaacgtc	780
taatacatct ggtgttggtt ctcattgtag aaatccaata aagcatttca ccgaaaaaaaa	840
aaaaaaaaaa	850

<210> 42  
 <211> 233  
 <212> PRT  
 <213> Ancylostoma caninum  
 <400> 42

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1				5					10					15	
Asp	Glu	Glu	Asp	Asp	Leu	Pro	Arg	Asn	Pro	Leu	Trp	Asp	Ala	Tyr	Lys
			20					25					30		
Asp	Asp	Asn	Gly	Lys	Tyr	Val	Ile	Pro	Tyr	Val	Ile	Asn	Gly	Ser	Tyr
		35					40					45			
Gly	Glu	Glu	Lys	Lys	Val	Leu	Phe	Glu	Met	Met	Asp	Glu	Ile	Asp	Lys
	50					55					60				
Asn	Thr	Cys	Val	Arg	Phe	Ile	Pro	Arg	Ser	Thr	Glu	Gln	Asp	Tyr	Ile
65					70					75					80
Glu	Ile	Val	Asn	Arg	Leu	Gly	Glu	Gly	Thr	Gly	Ala	Val	Val	Gly	Lys
				85					90					95	
Pro	Gly	Gly	Lys	Ser	Ile	Val	Leu	Leu	Glu	Ser	Ser	Lys	Ile	Leu	Asn
			100					105					110		
Asp	Pro	Thr	Pro	Ala	Pro	Val	Met	Gln	Thr	Leu	Met	Lys	Ile	Ile	Gly
		115					120					125			
Leu	Pro	Pro	Glu	His	Ile	Arg	Pro	Glu	Arg	Lys	Asp	His	Ile	Lys	Ile
	130					135					140				
His	Trp	Glu	Asn	Ile	Glu	Lys	Gly	Tyr	Glu	Ala	Phe	Phe	Ala	Leu	Ser
145					150					155					160
Ser	Val	Lys	Pro	Asp	Pro	Tyr	Gly	Ile	Pro	Tyr	Asp	Tyr	Tyr	Ser	Ile
				165					170					175	

US seq list.ST25.txt

Met His Tyr Lys Lys Asp Ala Phe Ala Lys Pro Gly Thr Ile Thr Met  
180 185 190

Glu Thr Leu Asp Lys Arg Tyr Gln Asp Ile Ile Gly Asn Gln Glu Lys  
195 200 205

Pro Ser Lys Leu Asp Tyr Lys Lys Ile Cys Thr Lys Tyr Lys Cys Asp  
210 215 220

Ile Cys Met Gly Glu Lys Met Lys Tyr  
225 230

<210> 43  
<211> 1168  
<212> DNA  
<213> Ancylostoma caninum

<400> 43  
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aaggaggaga catcacacag ctgagagaaa aaggggagcgc aatgttcaac gcccttcaca 180  
gaacgtcgag tctgaagtgg aacaagaggg attcagacgg gaattttgtc ataccgtaca 240  
taattacagg acgctatgac cgaacggagc ggggaatatc aaggaagcaa tgaggcgcat 300  
cgaggcaaat acgtgtattc gtttcaagca aagagactat gagagagact atatcgagat 360  
ccagaacaaa gctggacatg gatgttacac caatgtcgggt cgtgtcgggtg gcagaagtat 420  
actgatgctc gagtccagct tcgaggaaac atgcatggag acagaaatcg tgctgcacga 480  
gttgatgcac gttgtcggtc tgtggcacga acacatgcgc cacgatcgtg acaaatacat 540  
caaagtgcac tacgagaaca tcgaaaggag ttactggaac caattcgaga aagtctcacc 600  
gatggaagct accacgtata acgtaccgta tgactacaaa tccgtcatgc actacgagaa 660  
gtcggcattc gccagacctg gacgaatcag catggaaacg cttgatccca aatatcagaa 720  
cgtcatcgga caccagaagg acgcctctcc cagtgactac cgtaagatct gcgagatata 780  
ccagtgtaa aagtgcata acggcaagat cgagatcgga ggcgactcgg actccaaccc 840  
gaaaccgcca accgaggccc cagtcccat cagaccggcg ccagaaatca acggagaatg 900  
ccgcgatatg atcccgtctt tctgccgagc gttggcccg cgcacatga tcgactgcag 960  
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atttgcaaaa taaaaaaaaa aaaaaaaaaa 1168

US seq list.ST25.txt

<210> 44  
 <211> 366  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 44

Met Ala Thr Met Leu Ala Val Cys Arg Leu Val Val Phe Leu Thr Ala  
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Val His Thr Val Ser Ala Arg Gly Arg Pro Ile Asn Ile Phe Glu Gln  
 20 25 30

Lys Glu Gly Gly Asp Ile Thr Gln Leu Arg Glu Lys Gly Ser Ala Met  
 35 40 45

Phe Asn Ala Leu His Arg Thr Ser Ser Leu Lys Trp Asn Lys Arg Asp  
 50 55 60

Ser Asp Gly Asn Phe Val Ile Pro Tyr Ile Ile Thr Gly Arg Tyr Asp  
 65 70 75 80

Arg Thr Glu Arg Gly Thr Ile Lys Glu Ala Asn Arg Arg Ile Glu Ala  
 85 90 95

Asn Thr Cys Ile Arg Phe Lys Gln Arg Asp Tyr Glu Arg Asp Tyr Ile  
 100 105 110

Glu Ile Gln Asn Lys Ala Gly His Gly Cys Tyr Thr Asn Val Gly Arg  
 115 120 125

Val Gly Gly Arg Ser Ile Leu Met Leu Glu Ser Ser Phe Glu Glu Thr  
 130 135 140

Cys Met Glu Thr Glu Ile Val Leu His Glu Leu Met His Val Val Gly  
 145 150 155 160

Leu Trp His Glu His Met Arg His Asp Arg Asp Lys Tyr Ile Lys Val  
 165 170 175

His Tyr Glu Asn Ile Glu Arg Ser Tyr Trp Asn Gln Phe Glu Lys Val  
 180 185 190

Ser Pro Met Glu Ala Thr Thr Tyr Asn Val Pro Tyr Asp Tyr Lys Ser  
 195 200 205

Val Met His Tyr Glu Lys Ser Ala Phe Ala Arg Pro Gly Arg Ile Ser  
 210 215 220

US seq list.ST25.txt

Met Glu Thr Leu Asp Pro Lys Tyr Gln Asn Val Ile Gly His Gln Lys  
225 230 235 240

Asp Ala Ser Pro Ser Asp Tyr Arg Lys Ile Cys Glu Ile Tyr Gln Cys  
245 250 255

Lys Lys Cys Met Asn Gly Lys Ile Glu Ile Gly Gly Asp Ser Asp Ser  
260 265 270

Asn Pro Lys Pro Pro Thr Glu Ala Pro Val Thr Ile Arg Pro Ala Pro  
275 280 285

Glu Ile Asn Gly Glu Cys Arg Asp Met Ile Pro Ser Phe Cys Arg Ala  
290 295 300

Leu Ala Arg Ser His Met Ile Asp Cys Ser Phe Phe His Lys Gln Gln  
305 310 315 320

Cys Cys Ala Thr Cys Ala Glu Leu Gly His Arg Asp Gln Asp Gln Gly  
325 330 335

Gly Trp Leu Glu Gln Thr Gly Trp Pro Phe Asp Gly Leu Phe Arg Ile  
340 345 350

Phe Gly Gln Gly Gly Trp Pro Phe Thr Phe Phe Asn Arg Trp  
355 360 365

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<211> 621  
<212> DNA  
<213> Ancylostoma caninum

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ccaaggagggt agccgaccac atcaaggcta tcaactgagga ggagaagacc atcttgaagg 180  
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aactgcacgc agagctcctt gccgggaaca aaccttctct tgagggaactg aagaacactg 420  
tcaagaaata cgtggccgaa ttcgacgcgc tgaccgcagc cgcaaaagaa gatctcaaga 480  
agcattccc catcctcact tccattttca ccaacgagaa ggcaaaggcg ttgatggaca 540  
agcattgcc gaactaggtg aagcagcagt tgtttttagt cgaataaatg tttcaacttt 600

US seq list.ST25.txt

ttaaaaaaaaa aaaaaaaaaa a

621

<210> 46  
 <211> 181  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 46

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 Ala Pro Asn Val Glu Val Asn Lys Phe Glu Asp Ile Pro Glu Gln Tyr  
 20 25 30  
 Arg Glu Leu Ile Pro Lys Glu Val Ala Asp His Ile Lys Ala Ile Thr  
 35 40 45  
 Glu Glu Glu Lys Thr Ile Leu Lys Glu Val Leu Lys Asp Tyr Ala Lys  
 50 55 60  
 Tyr Lys Asp Glu Asn Glu Tyr Leu Ala Ala Leu Lys Glu Lys Ser Pro  
 65 70 75 80  
 Ser Leu His Glu Lys Ala Lys Lys Phe His Asp Phe Ile Lys Ala Lys  
 85 90 95  
 Val Asp Ala Leu Gly Asp Glu Ala Lys Ala Phe Val Lys Lys Val Ile  
 100 105 110  
 Ala Ala Ala Arg Lys Leu His Ala Glu Leu Leu Ala Gly Asn Lys Pro  
 115 120 125  
 Ser Leu Glu Glu Leu Lys Asn Thr Val Lys Lys Tyr Val Ala Glu Phe  
 130 135 140  
 Asp Ala Leu Thr Ala Ala Ala Lys Glu Asp Leu Lys Lys His Phe Pro  
 145 150 155 160  
 Ile Leu Thr Ser Ile Phe Thr Asn Glu Lys Ala Lys Ala Leu Met Asp  
 165 170 175  
 Lys His Leu Pro Asn  
 180

<210> 47  
 <211> 2384  
 <212> DNA  
 <213> Ancylostoma caninum

US seq list.ST25.txt

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ttggctacga tcgatgcacg aataaatgta ttccgtacac gtatggaggc tgtggaggggt 180  
cgagcaacat gttcgacact ttggaagaat gccaagaaaa atgtggcaag cccgaggacc 240  
gctgctcaaa accactggaa agaggaatat gtctggcatc aatgaaaaga tatggctacg 300  
atacaagcag taagaagtgt aaggccttca tctatggcgg atgtggcgggt aacgagaaca 360  
atttcgagac aatggctgag tgccgagaaa cttgcaagga cacctcttct gaagaagaat 420  
cagtacctga tgcattgcta ttgccatcag aagtggggcc atgtaaagga aaagaacgtc 480  
gcttctactt tgatcaaaaa cgtggcaact gcaagtcggt cttcttcggc gggttggtgtg 540  
gaaatggaaa taatttcattg accaaagcca aatgcatgga aacctgctcg aaacacatca 600  
aacctgaaac agagcaagac gtctgctcac agccaattaa agctggacct tgcattgcaa 660  
tggtgaaaag atatgctgac gacaacaaga aaaagagggtg cgtgcagttt atctatggag 720  
gatgtaaggg aaacaagaac aacttcgaga gcatggaaga gtgcaccccg acatgtaaga 780  
aagcagtacc agagcctgag caggacacct gctcacagcc cattgaagtt ggaccttgca 840  
aggcaatggt gaaaagatat gcgtacgaca acaagaaaaa taagtgcgta cggtttatct 900  
atggaggatg taagggaac aagaacaact tcgaaagcat ggaagagtg acccgacat 960  
gtaagaaagc agtaccagag cctgagcaag acacctgctc acagcccatt gaagttggac 1020  
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ttatctatgg aggatgtaag ggaaataaga acaacttcga aagcatggaa gaggcagccc 1140  
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aagagtgcac ccggacatgt aagaaagcag taccagagcc tgagcaagac acctgctcac 1380  
agcccattga agttggacct tgcaaggcaa tggtgaaaag atatgctgac gacaacaaga 1440  
aaaataagtg cgtgcgggtt atctatggag gatgtaaggg aaataagaac aacttcgaaa 1500  
gcatggaaga gtgcaccccg acatgcaaga aagcagtacc agagcctgaa cctgagaaag 1560  
agacctgctc tcagcccatt gaagctgggt cttgcaaggc aatggtgaga cgatttgctt 1620  
acgacaacgc aaaggaaaag tgcgtagagt tcttttacgg cggtatgcaa ggaaacaaga 1680  
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agcttgagaa ggatgtgtgt tcacaacctc tcacggctgg tccttgaga gcatcaatac 1800  
cgcgatacgg ctatgattct aaaaaacgaa agtgtgtgaa gttcacctac ggaggatgca 1860

US seq list.ST25.txt

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 gcccatgcaa aggaaaaaat cgtcgctatg cttacaacaa caagacagga aaatgcgtga 2040  
 gattcaccta tgggtggttgc gggggaaacg agaacaactt caagactaag aaagactgcc 2100  
 aggatgcgtg cgaaaacata aatgcagcta gtccatgcac ccttcctatc gacaaaggag 2160  
 aaggcgactt gaatctgacc agatatggct tcaaaaatgg caagtgtgtc gcgttcaaatt 2220  
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 gcctcaagta actacgaagc tccgctgcaa atcccagaag atcattcggt tgtctctgcc 2340  
 gtctatgaaa caataaagta ttaattttgt taaaaaaaaa aaaa 2384

<210> 48  
 <211> 759  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 48

Met Lys Val Leu Ala Leu Val Leu Leu Trp Ala Ala Thr Ala Thr Ala  
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 20 25 30

Ala Phe Arg Lys Phe Gly Tyr Asp Arg Cys Thr Asn Lys Cys Ile Pro  
 35 40 45

Tyr Thr Tyr Gly Gly Cys Gly Gly Ser Ser Asn Met Phe Asp Thr Leu  
 50 55 60

Glu Glu Cys Gln Glu Lys Cys Gly Lys Pro Glu Asp Arg Cys Ser Lys  
 65 70 75 80

Pro Leu Glu Arg Gly Ile Cys Leu Ala Ser Met Lys Arg Tyr Gly Tyr  
 85 90 95

Asp Thr Ser Ser Lys Lys Cys Lys Ala Phe Ile Tyr Gly Gly Cys Gly  
 100 105 110

Gly Asn Glu Asn Asn Phe Glu Thr Met Ala Glu Cys Arg Glu Thr Cys  
 115 120 125

Lys Asp Thr Ser Ser Glu Glu Glu Ser Val Pro Asp Ala Cys Leu Leu  
 130 135 140



US seq list.ST25.txt

Pro Ser Glu Val Gly Pro Cys Lys Gly Lys Glu Arg Arg Phe Tyr Phe  
145 150 155 160

Asp Gln Lys Arg Gly Asn Cys Lys Ser Phe Phe Phe Gly Gly Cys Gly  
165 170 175

Gly Asn Gly Asn Asn Phe Met Thr Lys Ala Lys Cys Met Glu Thr Cys  
180 185 190

Ser Lys His Ile Lys Pro Glu Thr Glu Gln Asp Val Cys Ser Gln Pro  
195 200 205

Ile Lys Ala Gly Pro Cys Met Ala Met Leu Lys Arg Tyr Ala Tyr Asp  
210 215 220

Asn Lys Lys Lys Arg Cys Val Gln Phe Ile Tyr Gly Gly Cys Lys Gly  
225 230 235 240

Asn Lys Asn Asn Phe Glu Ser Met Glu Glu Cys Thr Arg Thr Cys Lys  
245 250 255

Lys Ala Val Pro Glu Pro Glu Gln Asp Thr Cys Ser Gln Pro Ile Glu  
260 265 270

Val Gly Pro Cys Lys Ala Met Leu Lys Arg Tyr Ala Tyr Asp Asn Lys  
275 280 285

Lys Asn Lys Cys Val Arg Phe Ile Tyr Gly Gly Cys Lys Gly Asn Lys  
290 295 300

Asn Asn Phe Glu Ser Met Glu Glu Cys Thr Arg Thr Cys Lys Lys Ala  
305 310 315 320

Val Pro Glu Pro Glu Gln Asp Thr Cys Ser Gln Pro Ile Glu Val Gly  
325 330 335

Pro Cys Lys Ala Met Leu Lys Arg Tyr Ala Tyr Asp Asn Lys Lys Asn  
340 345 350

Lys Cys Val Arg Phe Ile Tyr Gly Gly Cys Lys Gly Asn Lys Asn Asn  
355 360 365

Phe Glu Ser Met Glu Glu Cys Thr Arg Thr Cys Lys Lys Ala Val Pro  
370 375 380

Glu Pro Glu Pro Glu Lys Glu Thr Cys Ser Gln Pro Ile Glu Val Gly  
385 390 395 400

US seq list.ST25.txt

Pro Cys Lys Ala Met Leu Lys Arg Tyr Ala Tyr Asp Asn Lys Lys Asn  
405 410 415

Lys Cys Val Arg Phe Ile Tyr Gly Gly Cys Lys Gly Asn Lys Asn Asn  
420 425 430

Phe Glu Ser Met Glu Glu Cys Thr Arg Thr Cys Lys Lys Ala Val Pro  
435 440 445

Glu Pro Glu Gln Asp Thr Cys Ser Gln Pro Ile Glu Val Gly Pro Cys  
450 455 460

Lys Ala Met Leu Lys Arg Tyr Ala Tyr Asp Asn Lys Lys Asn Lys Cys  
465 470 475 480

Val Arg Phe Ile Tyr Gly Gly Cys Lys Gly Asn Lys Asn Asn Phe Glu  
485 490 495

Ser Met Glu Glu Cys Thr Arg Thr Cys Lys Lys Ala Val Pro Glu Pro  
500 505 510

Glu Pro Glu Lys Glu Thr Cys Ser Gln Pro Ile Glu Ala Gly Pro Cys  
515 520 525

Lys Ala Met Val Arg Arg Phe Ala Tyr Asp Asn Ala Lys Glu Lys Cys  
530 535 540

Val Glu Phe Phe Tyr Gly Gly Cys Lys Gly Asn Lys Asn Asn Phe Glu  
545 550 555 560

Thr Met Glu Asp Cys Thr Phe Thr Cys Glu Gln Arg Leu Ala Lys Pro  
565 570 575

Glu Leu Glu Lys Asp Val Cys Ser Gln Pro Ile Thr Ala Gly Pro Cys  
580 585 590

Arg Ala Ser Ile Pro Arg Tyr Gly Tyr Asp Ser Lys Lys Arg Lys Cys  
595 600 605

Val Lys Phe Thr Tyr Gly Gly Cys Lys Gly Asn Gly Asn Arg Phe Pro  
610 615 620

Thr Lys Asn Glu Cys Glu Lys Thr Cys Lys Arg Gly Ala Thr Gly Thr  
625 630 635 640

Thr Asn Pro Gly Gly Glu Asn Asp Lys Cys Leu Leu Pro Ile Val Thr  
645 650 655

US seq list.ST25.txt

Gly Pro Cys Lys Gly Lys Asn Arg Arg Tyr Ala Tyr Asn Asn Lys Thr  
660 665 670

Gly Lys Cys Val Arg Phe Thr Tyr Gly Gly Cys Gly Gly Asn Glu Asn  
675 680 685

Asn Phe Lys Thr Lys Lys Asp Cys Gln Asp Ala Cys Glu Asn Ile Asn  
690 695 700

Ala Ala Ser Pro Cys Thr Leu Pro Ile Asp Lys Gly Glu Gly Asp Leu  
705 710 715 720

Asn Leu Thr Arg Tyr Gly Phe Lys Asn Gly Lys Cys Val Ala Phe Lys  
725 730 735

Tyr Gly Gly Arg Arg Gly Asn Leu Asn Asn Phe Gly Ser Lys Ala Asp  
740 745 750

Cys Lys Glu Ala Cys Leu Lys  
755

<210> 49  
<211> 1413  
<212> DNA  
<213> Ancylostoma caninum

<400> 49  
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actggcagtt gggaagacta tcagaaacag cgttaccact accagaagaa acttctggca 180  
aagtatgcgg cgatcaaagc gacaaaactg cagtctacca atgaaattga cgagcttctt 240  
cgcaactaca tggatgcgca atacttcggc accatccaaa tcggaactcc agcgcagaat 300  
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aaggaggatg gacgaaagat ggccatccag tatggcactg gctcaatgaa gggcttcatt 480  
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acgagcgagc caggcctcac cttcatcgca gcgaagtttg atggaatcct tggcataacc 600  
ttccctgaaa tctctgtgct cggagtaccg ccagtattcc acacgttcat tgaacagaag 660  
aaagtgccga gcccgggtgtt cgctctctgg ctcaacagaa atcctgactc ggaactcgga 720  
ggtgagatca cctcgggtgg aatggacacc cgacgatacg ttgagccgat cacatggact 780  
ccagtgacaa ggcgagggta ctggcagttc aagatggaca aggttcaagg aggatcaaca 840

US seq list.ST25.txt

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acttatgaag gagagtacat gattccttgc gacaagggtgc ctttccctcc ccgattatcc 1020
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gctgttcgaa ggtacaacaa gttctcggag gacagcggca gtgatgagga tgatgtattc 1320
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<210> 50
<211> 442
<212> PRT
<213> Ancylostoma caninum
<400> 50
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Leu Ala Leu Phe Thr Leu Ala Val Ala Ser Val His Arg Arg Thr Phe
1 5 10 15
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His His Pro Arg Arg Tyr Val Lys Ser Val Ser Leu Ser Arg Gln Pro
20 25 30
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```
Thr Leu Arg Glu Arg Leu Leu Gly Thr Gly Ser Trp Glu Asp Tyr Gln
35 40 45
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Lys Gln Arg Tyr His Tyr Gln Lys Lys Leu Leu Ala Lys Tyr Ala Ala
50 55 60
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Ile Lys Ala Thr Lys Leu Gln Ser Thr Asn Glu Ile Asp Glu Leu Leu
65 70 75 80
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Arg Asn Tyr Met Asp Ala Gln Tyr Phe Gly Thr Ile Gln Ile Gly Thr
85 90 95
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Pro Ala Gln Asn Phe Thr Val Ile Phe Asp Thr Gly Ser Ser Asn Leu
100 105 110
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Trp Val Pro Ser Glu Lys Met Pro Phe His Asp Ile Ala Cys Met Leu
115 120 125
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Arg His Arg Tyr Asp Ser Gly Ala Ser Ser Thr Tyr Lys Glu Asp Gly
130 135 140
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US seq list.ST25.txt

Arg Lys Met Ala Ile Gln Tyr Gly Thr Gly Ser Met Lys Gly Phe Ile  
145 150 155 160

Ser Lys Asp Asn Val Cys Ile Ala Gly Ile Cys Ala Glu Glu Gln Pro  
165 170 175

Phe Ala Glu Ala Thr Ser Glu Pro Gly Leu Thr Phe Ile Ala Ala Lys  
180 185 190

Phe Asp Gly Ile Leu Gly Ile Thr Phe Pro Glu Ile Ser Val Leu Gly  
195 200 205

Val Pro Pro Val Phe His Thr Phe Ile Glu Gln Lys Lys Val Pro Ser  
210 215 220

Pro Val Phe Ala Leu Trp Leu Asn Arg Asn Pro Asp Ser Glu Leu Gly  
225 230 235 240

Gly Glu Ile Thr Leu Gly Gly Asn Asp Thr Arg Arg Tyr Val Glu Pro  
245 250 255

Ile Thr Trp Thr Pro Val Thr Arg Arg Gly Tyr Trp Gln Phe Lys Met  
260 265 270

Asp Lys Val Gln Gly Gly Ser Thr Ser Ile Ala Cys Pro Asn Glu Phe  
275 280 285

Ser Gly Cys Gln Ala Ile Ala Asp Thr Gly Thr Ser Leu Ile Ala Gly  
290 295 300

Pro Lys Ala Gln Ser Arg Ala Ser Arg Asn Ser Leu Val Leu Glu Pro  
305 310 315 320

Thr Tyr Glu Gly Glu Tyr Met Ile Pro Cys Asp Lys Val Pro Phe Pro  
325 330 335

Pro Arg Leu Ser Phe Val Ile Glu Ala Arg Thr Phe Thr Leu Lys Gly  
340 345 350

Glu Asp Tyr Val Leu Thr Val Lys Ala Gly Gly Lys Ser Ile Cys Leu  
355 360 365

Ser Gly Phe Met Gly Met Asp Phe Pro Glu Arg Ile Gly Glu Leu Trp  
370 375 380

Ile Leu Gly Asp Val Phe Ile Gly Lys Tyr Tyr Thr Val Phe Asp Val

US seq list.ST25.txt  
 385 390 395 400

Gly Gln Ala Arg Leu Gly Phe Ala Gln Ala Lys Ser Glu Asp Gly Tyr  
 405 410 415

Pro Val Gly Pro Ala Val Arg Arg Tyr Asn Lys Phe Ser Glu Asp Ser  
 420 425 430

Gly Ser Asp Glu Asp Asp Val Phe Thr Leu  
 435 440

<210> 51  
 <211> 421  
 <212> DNA  
 <213> Ancylostoma caninum

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<220>  
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 <222> (413)..(413)  
 <223> n is a, c, g, or t

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 gcgtctatca cgctcacaat tggccagcgc cagtacaaaa ttgaatcaaa gaacctcatc 180  
 attcatgtcg aagcagatac atgcatcttg gcactacatg gataccactt tctcggagca 240  
 acatggatct ttggtgcacc gttcataagg cagttctgta atatttatga tatgggtaac 300  
 aaaaggatag gattcgctca ttcgctgcag aattagcctg catttactag ttnttattcg 360  
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 a 421

US seq list.ST25.txt

<210> 52  
 <211> 111  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 52

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 1 5 10 15

Glu Ile Ala Ser Asn Leu Thr Ala Thr Tyr Asn Lys Glu His Asp Leu  
 20 25 30

Tyr Tyr Ile Asp Cys Arg Ala Asn Ala Ser Ile Thr Leu Thr Ile Gly  
 35 40 45

Gln Arg Gln Tyr Lys Ile Glu Ser Lys Asn Leu Ile Ile His Val Glu  
 50 55 60

Ala Asp Thr Cys Ile Leu Ala Leu His Gly Tyr His Phe Leu Gly Ala  
 65 70 75 80

Thr Trp Ile Phe Gly Ala Pro Phe Ile Arg Gln Phe Cys Asn Ile Tyr  
 85 90 95

Asp Met Gly Asn Lys Arg Ile Gly Phe Ala His Ser Leu Gln Asn  
 100 105 110

<210> 53  
 <211> 371  
 <212> DNA  
 <213> Ancylostoma caninum

<400> 53

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ggttgtttat tacctcctgc ttgcgtatgc aaagacggat tctacagaga cacggtgatc	180
ggcgactgtg ttagggaaga agaatgcgac caacatgaga ttatacatgt ctgaacgaga	240
aagcaacaat aaccaaaggt tccaactctc gctctgcaaa atcgctagtt ggatgtctct	300
tttgcgtccg aatagtttta gttgatatta agtaagaact cctgctggaa agaataaagc	360
tttccaactc c	371

<210> 54  
 <211> 77  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 54

US seq list.ST25.txt

Lys Ala Tyr Pro Glu Cys Gly Glu Asn Glu Trp Leu Asp Asp Cys Gly  
1 5 10 15

Thr Gln Lys Pro Cys Glu Ala Lys Cys Asn Glu Glu Pro Pro Glu Glu  
20 25 30

Glu Asp Pro Ile Cys Arg Ser Arg Gly Cys Leu Leu Pro Pro Ala Cys  
35 40 45

Val Cys Lys Asp Gly Phe Tyr Arg Asp Thr Val Ile Gly Asp Cys Val  
50 55 60

Arg Glu Glu Glu Cys Asp Gln His Glu Ile Ile His Val  
65 70 75

<210> 55  
<211> 1321  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 55  
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cctcgacttc cacaacaatg ctcggagacg agttgcgcaa ggagttgagg ataacaatc 180  
cggcaactg aatccagcga agaacatgta taagctggac tgggactgtg agatggaaca 240  
gaagctccag gatgctatcc aatcctgccc aggcggcttt gctggaattc aagggtgttc 300  
gcagaatata ataagctggt caggctccgg tggattcccg aatccatcag aaaagataaa 360  
ctcaacactt gccagctggt ggggtggtgc aaaaaacaac ggcgtcgct cagacaacaa 420  
atacactggt ggaggtcttt acgccttttc caatatggtc ttctctgaga cgacaaaact 480  
cggttgcgcc tacaagggtt gcggcactaa actgacgcta tcgtgcattt ataacggaat 540  
tgggtatatg acaggcgcg ccaatgtggga gacaggtcag gcttgcaagg ccggagcaga 600  
ctgcaccaca ttcaagaact cagggtgcga agacggcctc tgcacgaaag gagcagatgt 660  
ccctgagacg aaccagcagt gtccgtcaaa caccggaatg actgattcag tcagagatac 720  
tttcttttca ttgcacaacg aattcagggtc gagtggtgcc cgaggtttgg aacccgatgc 780  
tcttggcgga aatgcaccaa aagcatccaa aatgctcaag atggtgtacg actgtgaagt 840  
agaagcatca gccatcagac atgggaataa atgctgttac caacattctc acggcgatga 900  
aagacccggc ctaggagaaa acatttaca aaccagcatt gtcaaatttg agaagaacaa 960  
agcagccaag caggcttcac aactttggtg gaacgagttg aaagagttcg gtgtcggccc 1020  
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US seq list.ST25.txt

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tattggtcaa ccatgttcg agtgtgaagc taccgccact tgcagcgtga ccgaaggatt 1260  
gtgcagtgcct ccttaattag tctacaataa agatgctact ttccaaaaaa aaaaaaaaaa 1320  
a 1321

<210> 56  
<211> 422  
<212> PRT  
<213> Ancylostoma ceylanicum

<400> 56

Phe Ser Pro Val Val Val Ile Ser Val Val Leu Thr Val Ala Phe Cys  
1 5 10 15

Asp Ala Ser Pro Val Lys Ala Ser Phe Gly Cys Ser Asn Ser Gly Ile  
20 25 30

Thr Asp Ser Asp Arg Gln Ala Phe Leu Asp Phe His Asn Asn Ala Arg  
35 40 45

Arg Arg Val Ala Gln Gly Val Glu Asp Asn Lys Ser Gly Lys Leu Asn  
50 55 60

Pro Ala Lys Asn Met Tyr Lys Leu Asp Trp Asp Cys Glu Met Glu Gln  
65 70 75 80

Lys Leu Gln Asp Ala Ile Gln Ser Cys Pro Gly Gly Phe Ala Gly Ile  
85 90 95

Gln Gly Val Ala Gln Asn Ile Ile Ser Trp Ser Gly Ser Gly Gly Phe  
100 105 110

Pro Asn Pro Ser Glu Lys Ile Asn Ser Thr Leu Ala Ser Trp Trp Gly  
115 120 125

Gly Ala Lys Asn Asn Gly Val Ala Ser Asp Asn Lys Tyr Thr Gly Gly  
130 135 140

Gly Leu Tyr Ala Phe Ser Asn Met Val Phe Ser Glu Thr Thr Lys Leu  
145 150 155 160

Gly Cys Ala Tyr Lys Val Cys Gly Thr Lys Leu Thr Leu Ser Cys Tyr  
165 170 175

Asn Gly Ile Gly Tyr Met Thr Gly Ala Pro Met Trp Glu Thr Gly Gln  
Page 69

180

185

190

Ala Cys Lys<sub>195</sub> Ala Gly Ala Asp Cys<sub>200</sub> Thr Thr Phe Lys Asn<sub>205</sub> Ser Gly Cys  
 Glu Asp<sub>210</sub> Gly Leu Cys Thr Lys<sub>215</sub> Gly Ala Asp Val Pro<sub>220</sub> Glu Thr Asn Gln  
 Gln Cys Pro Ser Asn Thr<sub>230</sub> Gly Met Thr Asp Ser<sub>235</sub> Val Arg Asp Thr Phe<sub>240</sub>  
 Leu Ser Leu His Asn<sub>245</sub> Glu Phe Arg Ser Ser<sub>250</sub> Val Ala Arg Gly Leu<sub>255</sub> Glu  
 Pro Asp Ala Leu<sub>260</sub> Gly Gly Asn Ala Pro<sub>265</sub> Lys Ala Ser Lys Met<sub>270</sub> Leu Lys  
 Met Val Tyr<sub>275</sub> Asp Cys Glu Val Glu<sub>280</sub> Ala Ser Ala Ile Arg<sub>285</sub> His Gly Asn  
 Lys Cys<sub>290</sub> Val Tyr Gln His Ser<sub>295</sub> His Gly Asp Glu Arg<sub>300</sub> Pro Gly Leu Gly  
 Glu Asn Ile Tyr Lys Thr<sub>310</sub> Ser Ile Val Lys Phe<sub>315</sub> Glu Lys Asn Lys Ala<sub>320</sub>  
 Ala Lys Gln Ala Ser<sub>325</sub> Gln Leu Trp Trp Asn<sub>330</sub> Glu Leu Lys Glu Phe<sub>335</sub> Gly  
 Val Gly Pro Ser<sub>340</sub> Asn Met Leu Thr Asp<sub>345</sub> Ala Trp Asn Arg Pro<sub>350</sub> Asn Met  
 Gln Ile Gly<sub>355</sub> His Tyr Thr Gln Met<sub>360</sub> Ala Trp Glu Ser Thr<sub>365</sub> Tyr Lys Leu  
 Gly Cys<sub>370</sub> Ala Val Ile Phe Cys<sub>375</sub> Asn Asp Phe Thr Phe<sub>380</sub> Gly Val Cys Gln  
 Tyr Gly Pro Gly Gly Asn<sub>390</sub> Tyr Met Asn His Leu<sub>395</sub> Ile Tyr Thr Ile Gly<sub>400</sub>  
 Gln Pro Cys Ser Glu<sub>405</sub> Cys Glu Ala Thr Ala<sub>410</sub> Thr Cys Ser Val Thr<sub>415</sub> Glu  
 Gly Leu Cys Ser Ala Pro<sub>420</sub>

US seq list.ST25.txt

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 <211> 740  
 <212> DNA  
 <213> Ancylostoma ceylanicum

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 agatcgcagg ttgccaaagg acaggccaag gatgactctc caggaaatgc accaaaagct 180  
 gccaaaatga agaaaatggt atatgactgt ggtgtcgaat caactgcaat gcagaatgct 240  
 aaaaaatgtg tcttcactca ttcgcatatg aagggacttg gcgaaaacat atggatgacg 300  
 actgcacgcg agatggataa agtgaaatca gctgaacagg ctagtcaggg ttggttcagt 360  
 gaactcgcgg aatacgggtgt agggcctgaa aataagctaa caatgcagct gtggaacagg 420  
 ccaaatactc agattggaca ttacacgcag atggtctggc aggacaccta caaactcgga 480  
 tgttatgtgg aatgggtgctc atctatgacc tacggcgtgt gtcagtatag ccctcaaggt 540  
 aacatgatga actcaatcat ctacgaaaaa ggaaaccctt gcactcagga ttcggactgt 600  
 ggctcaaattg ccagatgcac cgctgacaag gcgctttgca tcgtgcatgg atagctgggc 660  
 tatcccacgg tcaacacgcg ttctactaat tagctttgct tcctctataa ataaatgcat 720  
 tgaaacaaaa aaaaaaaaaa 740

<210> 58  
 <211> 217  
 <212> PRT  
 <213> Ancylostoma ceylanicum

<400> 58

Val Leu Val Pro Leu Leu Val Leu Leu Ala Val Ser Val Asp Ala Asn  
 1 5 10 15

Ser Val Arg Cys Gly Asn Asn Gly Met Thr Asp Glu Ala Arg Gln Lys  
 20 25 30

Phe Leu Asp Met His Asn Gly Tyr Arg Ser Gln Val Ala Lys Gly Gln  
 35 40 45

Ala Lys Asp Ala Leu Ser Gly Asn Ala Pro Lys Ala Ala Lys Met Lys  
 50 55 60

Lys Met Val Tyr Asp Cys Gly Val Glu Ser Thr Ala Met Gln Asn Ala  
 65 70 75 80

Lys Lys Cys Val Phe Thr His Ser His Met Lys Gly Leu Gly Glu Asn  
 85 90 95

US seq list.ST25.txt

Ile Trp Met Thr Thr Ala Arg Glu Met Asp Lys Val Lys Ser Ala Glu  
100 105 110

Gln Ala Ser Gln Gly Trp Phe Ser Glu Leu Ala Glu Tyr Gly Val Gly  
115 120 125

Pro Glu Asn Lys Leu Thr Met Gln Leu Trp Asn Arg Pro Asn Thr Gln  
130 135 140

Ile Gly His Tyr Thr Gln Met Val Trp Gln Asp Thr Tyr Lys Leu Gly  
145 150 155 160

Cys Tyr Val Glu Trp Cys Ser Ser Met Thr Tyr Gly Val Cys Gln Tyr  
165 170 175

Ser Pro Gln Gly Asn Met Met Asn Ser Ile Ile Tyr Glu Lys Gly Asn  
180 185 190

Pro Cys Thr Gln Asp Ser Asp Cys Gly Ser Asn Ala Arg Cys Thr Ala  
195 200 205

Asp Lys Ala Leu Cys Ile Val His Gly  
210 215

<210> 59  
<211> 1705  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 59  
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tcaacggcac ctactcatg aaaattcgtg aaaaattcat tgcaactgaga gaaaaataa 180  
aggctaagct gaagctctcc ccggcacgaa agccctact aggcgaaatt atgaagcaca 240  
ttattaaaat caaaaaggat aaaattcaag agaaagggtga ctcaatcgaa gaaatcaact 300  
cgaaaagtgc tatcggagag ttgctgtacc aagggtgacat cgttctgaca aataagcaag 360  
cccaggagat tgttgatgac attgaggggtg atgaaaatga ccgcggaaaa cgacaggcgt 420  
tccgtgatcg caactatcca cggacattat ggtcgaaggg agtgtattat tacttccatg 480  
gaaacgcaac tcctgagggtg agaagcgttt tcacgaaagg cgcaagactt tggatgaaag 540  
atacttgcac tgacttcttt gagagcaact cagcaccga taggattcga gttttcaaag 600  
aacaaggatg ttggctgtac gttggttagga tcgggggtca gcaagatctg tcgctgggaa 660  
aaggctgtga atcgggttga acagctgcac acgaaatcgg tcatgctatt ggcttctacc 720

US seq list.ST25.txt

acactcactc aagacacgat cgcgataact tcatcacatt taacgcacaa aatgtcaagc	780
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catacgacta cggaagtatt atgcactatg gcgcaaatac cgcctctgcg aatggacagc	900
cttcaatggt tccgtttgac ccgaaatacg tagaaactct cggatcaccc ataatttcct	960
tttatgaact tctcatgatc aacaaaccct acgagtgcac caagaattgc gatccgaata	1020
cttctgcgca gtgtaagatg ggtggcttcc cacatcctcg ggattgtgga agatgcattt	1080
gtcccagtggt atatggaggc caactatgcg accagaagcc atccggatgc ggatcgatcc	1140
tccaagcgac cgctcagtac cagaacttgc acgacaaacg tggaaacgaa gcagcagggc	1200
agagacctag agaagacatg gacttctgct actactggat tacggctcca cagggttcaa	1260
gaatcgaaat caaaatcgct gatctatctc gaggagccgc tgttgatggg tgtcagtatt	1320
ggggagtaga aattaagact cacgctgacc agcgcctcac tggctacagg ttctgtgctc	1380
cagaagatgt cggacgtaca ttggtgtcga actctaact cgtaccaata atcacatata	1440
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gaccaaggcc tcagccacaa ccaaacagca attgcgtcga caatgaacag tgcgcgaccc	1560
tcatcagaac aaagaatttc tgtcagagca gatcggtcac agagtccgtc aaaagaggtc	1620
tatgtccaaa ggcattgcgt ttttgccgct aacttttcac gagacaatga aataaatatt	1680
cgcatcatca aaaaaaaaaa aaaaa	1705

<210> 60  
 <211> 545  
 <212> PRT  
 <213> Ancylostoma ceylanicum

<400> 60

Met Arg Val Phe Leu Val Leu Leu Leu Ala Ile Cys Ala Ser Ala  
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Gly Phe Phe Asp Thr Lys Leu Gly Glu Lys Ile Lys Lys Thr Leu Gly  
 20 25 30

Lys Ile Lys Ala Ala Leu Asn Gly Thr Leu Leu Met Lys Ile Arg Glu  
 35 40 45

Lys Phe Ile Ala Leu Arg Glu Lys Ile Lys Ala Lys Leu Lys Leu Ser  
 50 55 60

Pro Ala Arg Lys Ala Leu Leu Gly Glu Ile Met Lys His Ile Ile Lys  
 65 70 75 80

Ile Lys Lys Asp Lys Ile Gln Glu Lys Gly Asp Ser Ile Glu Glu Ile  
 Page 73

Asn Ser Lys Ser Ala Ile Gly Glu Leu Leu Tyr Gln Gly Asp Ile Val  
100 105 110

Leu Thr Asn Lys Gln Ala Gln Glu Ile Val Asp Ile Glu Gly Asp Glu  
115 120 125

Asn Asp Arg Gly Lys Arg Gln Ala Phe Arg Asp Arg Asn Tyr Pro Arg  
130 135 140

Thr Leu Trp Ser Lys Gly Val Tyr Tyr Tyr Phe His Gly Asn Ala Thr  
145 150 155 160

Pro Glu Val Arg Ser Val Phe Thr Lys Gly Ala Arg Leu Trp Met Lys  
165 170 175

Asp Thr Cys Ile Asp Phe Phe Glu Ser Asn Ser Ala Pro Asp Arg Ile  
180 185 190

Arg Val Phe Lys Glu Gln Gly Cys Trp Ser Tyr Val Gly Arg Ile Gly  
195 200 205

Gly Gln Gln Asp Leu Ser Leu Gly Lys Gly Cys Glu Ser Val Gly Thr  
210 215 220

Ala Ala His Glu Ile Gly His Ala Ile Gly Phe Tyr His Thr His Ser  
225 230 235 240

Arg His Asp Arg Asp Asn Phe Ile Thr Phe Asn Ala Gln Asn Val Lys  
245 250 255

Pro Asp Trp Leu Asp Gln Phe Thr Lys Gln Thr Pro Ala Thr Asn Glu  
260 265 270

Asn Tyr Gly Ile Thr Tyr Asp Tyr Gly Ser Ile Met His Tyr Gly Ala  
275 280 285

Asn Ser Ala Ser Ala Asn Gly Gln Pro Ser Met Val Pro Phe Asp Pro  
290 295 300

Lys Tyr Val Glu Thr Leu Gly Ser Pro Ile Ile Ser Phe Tyr Glu Leu  
305 310 315 320

Leu Met Ile Asn Lys Pro Tyr Glu Cys Thr Lys Asn Cys Asp Pro Asn  
325 330 335

US seq list.ST25.txt

Thr Ser Ala Gln Cys Lys Met Gly Gly Phe Pro His Pro Arg Asp Cys  
340 345 350

Gly Arg Cys Ile Cys Pro Ser Gly Tyr Gly Gly Gln Leu Cys Asp Gln  
355 360 365

Lys Pro Ser Gly Cys Gly Ser Ile Leu Gln Ala Thr Ala Gln Tyr Gln  
370 375 380

Asn Leu His Asp Lys Arg Gly Asn Glu Ala Ala Gly Gln Arg Pro Arg  
385 390 395 400

Glu Asp Met Asp Phe Cys Tyr Tyr Trp Ile Thr Ala Pro Gln Gly Ser  
405 410 415

Arg Ile Glu Ile Lys Ile Ala Asp Leu Ser Arg Gly Ala Ala Val Asp  
420 425 430

Gly Cys Gln Tyr Trp Gly Val Glu Ile Lys Thr His Ala Asp Gln Arg  
435 440 445

Leu Thr Gly Tyr Arg Phe Cys Ala Pro Glu Asp Val Gly Arg Thr Leu  
450 455 460

Val Ser Asn Ser Asn Ile Val Pro Ile Ile Thr Tyr Asn Phe Tyr Ala  
465 470 475 480

Thr Thr Val Asp Ile Gln Tyr Arg Ile Val Gly Gly Asn Val Gly Gly  
485 490 495

Pro Arg Pro Gln Pro Gln Pro Asn Ser Asn Cys Val Asp Asn Glu Gln  
500 505 510

Cys Ala Thr Leu Ile Arg Thr Lys Asn Phe Cys Gln Ser Arg Ser Phe  
515 520 525

Thr Glu Ser Val Lys Arg Gly Leu Cys Pro Lys Ala Cys Gly Phe Cys  
530 535 540

Arg  
545

<210> 61  
<211> 893  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 61  
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60

US seq list.ST25.txt

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atataagacg gccctgaaac aagcgatcaa ggagcgagaa gagaagatcc gagcccgtct 300
cgccggcaag aaggtgaagg ccgttgagtc gaccaaagaa gaggacctgc cgaagccgcc 360
acagaagccg tcattctgca caccagaaga cactaccagc ttcttctttg aaggatgcat 420
gatccagaac aacaagatct acgtcggaaa cactttcgct cgtgacctga cccaatctga 480
aatcggcgaa ctgaaggaat tcgagaagaa attcaaggtc taccaggact acgttcagaa 540
gcaggccgaa cagcaagtga acagcctctt cggcggctct gacttcttct cggcactgtt 600
cagcggcggg gagaccaagc catccacgac cactgtggca ccagaacttc ctgaagacgc 660
tcccagagcag ccgcccacgc ccaacttctg caccagaata atctaaacgt gctctgaatt 720
gtccacttag ttgttggaat ggttggtttg gtgaatagcg acttcgcttc ccctctcgta 780
cttacggtgt cgactagcac attagtcatg cgttgcaata tttgatcatt gtattaaggt 840
atattgtaca tttatataat aaaattatat ttcaactcaa aaaaaaaaaa aaa 893

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<210> 62  
 <211> 227  
 <212> PRT  
 <213> Ancylostoma ceylanicum  
 <400> 62

Met Lys Leu Leu Ala Leu Ser Ala Leu Cys Ala Leu Ala Phe Ala Ala  
 1 5 10 15

Pro Arg Asp Lys Arg Leu Ala Val Ser Thr Ile Thr Val Thr Gly Gly  
 20 25 30

Leu Gly Leu Ser Thr Gly Cys Val Val Thr Gly Asn Val Leu Tyr Ala  
 35 40 45

Asn Gly Phe Arg Val Arg Glu Ile Asn Pro Ser Glu Gln Gln Glu Leu  
 50 55 60

Val Lys Tyr Gln Asn Asp Val Ala Glu Tyr Lys Thr Ala Leu Lys Gln  
 65 70 75 80

Ala Ile Lys Glu Arg Glu Glu Lys Ile Arg Ala Arg Leu Ala Gly Lys  
 85 90 95

Lys Val Lys Ala Val Glu Ser Thr Lys Glu Glu Asp Leu Pro Lys Pro  
 100 105 110



US seq list.ST25.txt

Pro Gln Lys Pro Ser Phe Cys Thr Pro Glu Asp Thr Thr Gln Phe Phe  
115 120 125

Phe Glu Gly Cys Met Ile Gln Asn Asn Lys Ile Tyr Val Gly Asn Thr  
130 135 140

Phe Ala Arg Asp Leu Thr Gln Ser Glu Ile Gly Glu Leu Lys Glu Phe  
145 150 155 160

Glu Lys Lys Phe Lys Val Tyr Gln Asp Tyr Val Gln Lys Gln Ala Glu  
165 170 175

Gln Gln Val Asn Ser Leu Phe Gly Gly Ser Asp Phe Phe Ser Ala Leu  
180 185 190

Phe Ser Gly Gly Glu Thr Lys Pro Ser Thr Thr Thr Val Ala Pro Glu  
195 200 205

Leu Pro Glu Asp Ala Pro Glu Gln Pro Pro Thr Pro Asn Phe Cys Thr  
210 215 220

Arg Ile Ile  
225

<210> 63  
<211> 407  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 63  
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catctcagt agggaaacagt cgatagcagt taaaggacgc cttctgtgcg gtgatcaacc 120  
agcagcgaac gtcagagtga agttgtggga agaagacaca ggaccagatc cagatgacct 180  
actggatgca ggatacacga actctaattg tgaattccaa ctccaaggcg gaacaataga 240  
gacgactccc attgatcccg tcttgaaaat ttaccatgat tgcaatgacg tgactggttt 300  
tctgagcgta cctaaacctg gcagcagaaa agtgagggtc tccttaccgg acaaatacat 360  
cagcgatgga atggttccta agaaagtcac ggacatcggt gttatca 407

<210> 64  
<211> 127  
<212> PRT  
<213> Ancylostoma ceylanicum

<400> 64

Met Ile Gln Leu Leu Leu Leu Ala Leu Leu Pro Val Cys Ile Ser Val

1 5 15  
Arg Glu Gln Ser Ile Ala Val Lys Gly Arg Leu Leu Cys Gly Asp Gln  
20 25 30  
Pro Ala Ala Asn Val Arg Val Lys Leu Trp Glu Glu Asp Thr Gly Pro  
35 40 45  
Asp Pro Asp Asp Leu Leu Asp Ala Gly Tyr Thr Asn Ser Asn Gly Glu  
50 55 60  
Phe Gln Leu Gln Gly Gly Thr Ile Glu Thr Thr Pro Ile Asp Pro Val  
65 70 75 80  
Leu Lys Ile Tyr His Asp Cys Asn Asp Val Thr Gly Phe Leu Ser Val  
85 90 95  
Pro Lys Pro Gly Ser Arg Lys Val Arg Phe Ser Leu Pro Asp Lys Tyr  
100 105 110  
Ile Ser Asp Gly Met Val Pro Lys Lys Val Met Asp Ile Gly Val  
115 120 125

<210> 65  
<211> 26  
<212> DNA  
<213> Artificial

<220>  
<223> synthetic oligonucleotide primer

<400> 65  
cttctcatga tcaacaaaca cvtacg

26

<210> 66  
<211> 25  
<212> DNA  
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<220>  
<223> synthetic oligonucleotide primer

<400> 66  
aatctaactc caacatcttc tggtg

25

<210> 67  
<211> 425  
<212> PRT  
<213> Ancylostoma duodenale

<400> 67

Met Phe Ser Ser Val Val Val Ile Ser Val Ile Ser Thr Ile Ala Phe

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	20							25					30
Ile	Thr	Asp	Ser	Asp	Arg	Gln	Ala	Phe	Leu	Asp	Phe	His	Asn
	35						40					45	Asn
													Ala
Arg	Arg	Arg	Val	Ala	Gln	Gly	Val	Glu	Asp	Asn	Lys	Ser	Gly
	50					55					60		Lys
													Leu
Asn	Pro	Ala	Lys	Asn	Met	Tyr	Lys	Leu	Glu	Trp	Asp	Cys	Lys
65					70					75			Met
													Glu
Gln	Gln	Leu	Gln	Asp	Ala	Ile	Gln	Ser	Cys	Pro	Gly	Gly	Ser
				85					90				Ala
													95
Ile	Gln	Gly	Phe	Ser	Gln	Asn	Val	Met	Ser	Trp	Ser	Asn	Ser
			100					105					110
													Gly
Phe	Pro	Asn	Ser	Ser	Glu	Lys	Ile	Glu	Ser	Thr	Leu	Ser	Gly
		115					120					125	Trp
													Trp
Ser	Gly	Ala	Lys	Asn	Asn	Gly	Val	Gly	Ser	Asp	Asn	Lys	Tyr
	130					135					140		Thr
													Gly
Gly	Gly	Leu	Tyr	Ala	Phe	Ser	Asn	Met	Val	Phe	Ser	Glu	Thr
145					150					155			Thr
													Lys
Ile	Gly	Cys	Ala	Tyr	Lys	Val	Cys	Gly	Thr	Lys	Met	Ala	Thr
				165					170				Ser
													175
Ile	Tyr	Asn	Gly	Ile	Gly	Tyr	Ile	Thr	Asn	Ala	Pro	Met	Trp
			180					185					190
													Glu
Gly	Gln	Ala	Cys	Lys	Thr	Gly	Ala	Asp	Cys	Ser	Thr	Tyr	Lys
		195					200					205	Asn
													Ser
Gly	Cys	Glu	Asp	Ser	Leu	Cys	Thr	Lys	Gly	Ala	Asp	Val	Pro
	210					215					220		Glu
													Thr
Asn	Gln	Gln	Cys	Pro	Ser	Asn	Thr	Gly	Met	Thr	Asp	Ser	Val
225					230					235			Arg
													240
Thr	Phe	Leu	Ser	Leu	His	Asn	Gly	Phe	Arg	Ser	Ser	Val	Ala
				245					250				Arg
													255
													Gly

US seq list.ST25.txt  
 Leu Glu Pro Asp Ala Leu Gly Gly Asn Ala Pro Lys Ala Ala Lys Met  
                   260                  265                  270

Leu Lys Met Val Tyr Asp Cys Glu Val Glu Ala Ser Ala Ile Arg His  
                   275                  280                  285

Gly Asn Lys Cys Val Tyr Gln His Ser Ser Gly Asn Asp Arg Pro Gly  
                   290                  295                  300

Leu Gly Glu Asn Ile Tyr Lys Thr Ser Val Gln Lys Phe Glu Lys Asn  
                   305                  310                  315                  320

Lys Ala Ala Lys Gln Ala Ser Glu Leu Trp Trp Asn Glu Leu Arg Glu  
                   325                  330                  335

Phe Gly Val Gly Pro Ser Asn Asn Leu Thr Asn Ala Leu Trp Asn Arg  
                   340                  345                  350

Pro Gly Met Gln Ile Gly His Tyr Thr Gln Met Ala Trp Asp Thr Thr  
                   355                  360                  365

Tyr Lys Leu Gly Cys Ala Val Val Phe Cys Asn Asp Phe Thr Phe Gly  
                   370                  375                  380

Val Cys Gln Tyr Gly Pro Gly Gly Asn Tyr Met Asn His Leu Ile Tyr  
                   385                  390                  395                  400

Thr Met Gly Gln Pro Cys Ser Gln Cys Ala Ala Thr Ala Thr Cys Ser  
                   405                  410                  415

Val Thr Glu Gly Leu Cys Ser Ala Pro  
                   420                  425

<210> 68  
 <211> 216  
 <212> PRT  
 <213> Ancylostoma duodenale

<400> 68

Met Leu Val Pro Val Ala Leu Leu Ala Leu Leu Ala Val Ala Val Glu  
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Gly Asn Ser Met Arg Cys Gly Asn Asn Gly Met Thr Asp Glu Ala Arg  
                   20                  25                  30

Gln Glu Phe Leu Asp Val His Asn Gly Tyr Arg Ser Lys Val Ala Lys  
                   35                  40                  45

US seq list.ST25.txt

Gly Gln Ala Lys Asp Ala Leu Gly Gly Asn Ala Pro Lys Ala Ala Lys  
50 55 60

Met Lys Lys Met Ile Tyr Asp Cys Asn Val Glu Ser Thr Ala Met Gln  
65 70 75 80

Asp Ala Lys Lys Cys Val Phe Ala His Ser His Lys Gly Leu Gly Glu  
85 90 95

Asn Ile Tyr Met Ser Thr Ala Arg Gln Met Asp Lys Ala Glu Ala Ala  
100 105 110

Gln Gln Ala Ser Asp Gly Trp Phe Ala Glu Leu Ala Lys Tyr Gly Val  
115 120 125

Gly Gln Glu Asn Lys Leu Thr Met Gln Leu Trp Asn Arg Gly Val Met  
130 135 140

Ile Gly His Tyr Thr Gln Met Val Trp Gln Glu Ser Tyr Lys Leu Gly  
145 150 155 160

Cys Tyr Val Glu Trp Cys Pro Ser Met Thr Tyr Gly Val Cys Gln Tyr  
165 170 175

Ser Pro Gln Gly Asn Met Met Asn Ser Ile Ile Tyr Glu Lys Gly Asn  
180 185 190

Pro Cys Thr Gln Asp Ser Asp Cys Gly Ser Asn Ala Lys Cys Ser Ser  
195 200 205

Gly Glu Ala Leu Cys Ile Val Gln  
210 215

<210> 69  
<211> 207  
<212> PRT  
<213> Necator americanus

<400> 69

Met Ser Ser Ile Thr Cys Leu Val Leu Leu Ser Ile Ala Ala Tyr Ser  
1 5 10 15

Lys Ala Gly Cys Pro Asp Asn Gly Met Ser Glu Glu Ala Arg Gln Lys  
20 25 30

Phe Leu Glu Leu His Asn Ser Leu Arg Ser Ser Val Ala Leu Gly Gln  
35 40 45

US seq list.ST25.txt

Ala Lys Asp Gly Ala Gly Gly Asn Ala Pro Lys Ala Ala Lys Met Lys  
50 55 60

Thr Met Ala Tyr Asp Cys Glu Val Glu Lys Thr Ala Met Asn Asn Ala  
65 70 75 80

Lys Gln Cys Val Phe Lys His Ser Gln Pro Asn Gln Arg Lys Gly Leu  
85 90 95

Gly Glu Asn Ile Phe Met Ser Ser Asp Ser Gly Lys Ala Lys Ala Ala  
100 105 110

Glu Gln Ala Ser Lys Ala Trp Phe Gly Glu Leu Ala Glu Lys Gly Val  
115 120 125

Gly Gln Asn Leu Lys Leu Thr Gly Gly Leu Phe Ser Arg Gly Val Gly  
130 135 140

His Tyr Thr Gln Met Val Trp Gln Glu Thr Val Lys Leu Gly Cys Tyr  
145 150 155 160

Val Glu Ala Cys Ser Asn Met Cys Tyr Val Val Cys Gln Tyr Gly Pro  
165 170 175

Ala Gly Asn Met Met Gly Lys Asp Ile Tyr Glu Lys Gly Glu Pro Cys  
180 185 190

Ser Lys Cys Glu Asn Cys Asp Lys Glu Lys Gly Leu Cys Ser Ala  
195 200 205

<210> 70  
<211> 31  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic oligonucleotide primer

<400> 70  
ctctcgagaa aagaagccca gtaaagccag c

31

<210> 71  
<211> 28  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic oligonucleotide primer

<400> 71  
tgctagagg agcactgcac aatccttc

28

US seq list.ST25.txt

<210> 72  
 <211> 27  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic oligonucleotide primer  
  
 <400> 72  
 gggaattcgg aaataatgga atgaccg 27  
  
 <210> 73  
 <211> 26  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic oligonucleotide primer  
  
 <400> 73  
 tgtctagacc atgcacgatg caaagc 26  
  
 <210> 74  
 <211> 21  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic oligonucleotide primer  
  
 <400> 74  
 gcaaattggca ttctgacatc c 21  
  
 <210> 75  
 <211> 21  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic oligonucleotide primer  
  
 <400> 75  
 tactattgcc agcattgctg c 21  
  
 <210> 76  
 <211> 678  
 <212> DNA  
 <213> Ancylostoma caninum  
  
 <400> 76  
 gaaagggttta attacccaag tttgagggtg aaaaatgggc cactacaagc tgacctactt 60  
 caacggacgt ggccctggcg aatgcgcgcg tcagttgttc gctcttgctg accaacaata 120  
 tgaggatatt cgtgttacac atgaggattt ccccgagata aaaccaaatt tgccatttgg 180  
 acaactgccg ctgcttaacg aggatggtaa agaactcgct cagtcaaacg ccatcaatcg 240

US seq list.ST25.txt

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ttacctggct aggaaattcg gattcgctgg caaaacgcca tttagaggagg ctctagtgga 300
ctcgctggca gatcagatga cggactaccg tgtagaaata aaaccattcg tctatacagc 360
gtatggacat cagaaattcg gtgacctgga gacgctaaaa aaggatgtga tgcttcctgc 420
acgagacaag ttcctcgggt tcatcaccaa attcttaaag aacaacccat caggattctt 480
ggttggtgac tcggtgactt ggatagatct gttgcttgct gaacatgctt ccgacatata 540
gtcaaagggt cccgaatacc tcgaagggtt tcctgagggtg aaggctcata tggaaaagggt 600
gcgatctatt ccgaaactga aaaaatggat cgagaccaga ccggagactc acttctgatc 660
gatacgcggg attttttc 678

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<210> 77
<211> 207
<212> PRT
<213> Ancylostoma caninum
<400> 77

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Met Val His Tyr Lys Leu Thr Tyr Phe Asn Gly Arg Gly Leu Gly Glu
1          5          10          15

Cys Ala Arg Gln Leu Phe Ala Leu Ala Asp Gln Gln Tyr Glu Asp Ile
20          25          30

Arg Val Thr His Glu Asp Phe Pro Glu Ile Lys Pro Asn Leu Pro Phe
35          40          45

Gly Gln Leu Pro Leu Leu Asn Glu Asp Gly Lys Glu Leu Ala Gln Ser
50          55          60

Asn Ala Ile Asn Arg Tyr Leu Ala Arg Lys Phe Gly Phe Ala Gly Lys
65          70          75          80

Thr Pro Phe Glu Glu Ala Leu Val Asp Ser Leu Ala Asp Gln Met Thr
85          90          95

Asp Tyr Arg Val Glu Ile Lys Pro Phe Val Tyr Thr Ala Tyr Gly His
100         105         110

Gln Lys Phe Gly Asp Leu Glu Thr Leu Lys Lys Asp Val Met Leu Pro
115         120         125

Ala Arg Asp Lys Phe Leu Gly Phe Ile Thr Lys Phe Leu Lys Asn Asn
130         135         140

Pro Ser Gly Phe Leu Val Gly Asp Ser Val Thr Trp Ile Asp Leu Leu
145         150         155         160

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US seq list.ST25.txt

Leu Ala Glu His Ala Ser Asp Ile Gln Ser Lys Val Pro Glu Tyr Leu  
165 170 175

Glu Gly Phe Pro Glu Val Lys Ala His Met Glu Lys Val Arg Ser Ile  
180 185 190

Pro Lys Leu Lys Lys Trp Ile Glu Thr Arg Pro Glu Thr His Phe  
195 200 205

<210> 78  
<211> 16  
<212> DNA  
<213> Artificial

<220>  
<223> synthetic oligonucleotide primer

<400> 78  
gctctccggc tgggtgg 16

<210> 79  
<211> 21  
<212> DNA  
<213> Artificial

<220>  
<223> synthetic oligonucleotide primer

<400> 79  
ttaaggagcg ctgcacaagc c 21

<210> 80  
<211> 28  
<212> DNA  
<213> Artificial

<220>  
<223> synthetic oligonucleotide primer

<400> 80  
gggaattcaa ttctatgaga tgcggaaa 28

<210> 81  
<211> 28  
<212> DNA  
<213> Artificial

<220>  
<223> synthetic oligonucleotide primer

<400> 81  
tgtctagata gccagccacg acgcaaag 28

<210> 82  
<211> 753

## US seq list.ST25.txt

&lt;212&gt; DNA

&lt;213&gt; Necator americanus

&lt;400&gt; 82

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gaaaatcaca atgatgtctt ctatcacatg tttggttctt ctctcgattg cagcgtactc      60
caaagccggt tgtcctgaca atggaatgtc agaggaagca cggcaaaaat tccttgaatt      120
gcacaattcg ttgagaagtt cggttgcatc gggacaggcc aaggatggag ctggtggaaa      180
tgccccgaaa gctgctaaga tgaagacgat ggcatacgat tgcgaagttg aaaagactgc      240
aatgaataac gcgaaacaat gtgtattcaa gcactcgcaa cctaaccaaa ggaaaggatt      300
gggagagaat atatttatgt cttcggatag cggtatggac aaagcaaagg ctgctgagca      360
ggctagcaaa gcttggttcg gcgaacttgc agaaaaagga gttggacaga atcttaagct      420
tacaggaggc ttgttcagca gaggagtcgg gcactataca cagatgggat ggcaagaaac      480
cgtaaagctt ggatgctatg tggaagcgtg ctcaaatatg tgttatgtgg tgtgccagta      540
cggtcctgct ggaaatatga tgggcaagga tatctacgag aaaggagaac cgtgttcgaa      600
atgtgagaat tgcgacaagg agaagggact ctgcagtgct tgattagttg tgttcagtga      660
agctcattac gctcacatac ttttaacaaat cgtagtgatc tgtagttgct ttaatatcca      720
aataaacatg atgccagcaa aaaaaaaaaa aaa                                     753

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&lt;210&gt; 83

&lt;211&gt; 1134

&lt;212&gt; DNA

&lt;213&gt; Necator americanus

&lt;400&gt; 83

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tctgtttcgc tggttgagcc gacaggcata ggtgagtttc ttgctcaacc agcacctgca      120
tatgctagaa gactcacagg gcaggccctt gttgactacg tcaattcgca ccactcattg      180
tacaaggcca aatattcacc agatgtcaa gaacgcatga aatctagaat tatggatttg      240
agtttcatgg ttgatgcgga agtcatgatg gaagaaatgg accagcagga ggatatagat      300
ctcgctgttt ctttacctga aagtttcgac gctcgtgaaa aatggccaga atgtccttca      360
ataggattaa tccgtgatca gtccgccggt ggaggatgtt gggcagtatc ctacagagag      420
gtgatgaccg acaggatctg tatacaatca aatggaacaa agcagggtga tgtttccgaa      480
acggatatct tatcatgctg tggacaacgt tgcggtagcg ggtgtacctc aggtgtgcca      540
cgtcaagctt tcaactatgc aattcgtaaa ggtgtttgca gtggaggacc atatggaacg      600
aaggggtgtt gcaaacccta tcctttctat ccatgcggct atcatgctca tctgccatat      660
tatggaccat gtccagatgg tatgtggcct acgccaacat gcgaaaaggc atgtcaatcc      720
gactatactg ttccgtacaa cgatgacagg atcttcggca gcaaaactat tgtcttgacg      780

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US seq list.ST25.txt

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 gtttacgaag atttcgctta ttacaagaat ggaatttaca tgactggtct cggtagagcg 900  
 acaggcgcac atgcagtcaa aattattggc tgggggtgaag aaaatggagt caagtattgg 960  
 ttgattgcaa actcgtggaa cactgattgg ggagagaatg gcttcttccg catgcttcgt 1020  
 ggaacaaacc ttgcgatat tgaactaagc gcgactggag gaacgttcaa ggtgtgaacg 1080  
 tgatcgaaaa gaacgatttt gaacaaaaat cttcccgtat tgtcatcaaa aaaa 1134

<210> 84  
 <211> 347  
 <212> PRT  
 <213> Necator americanus

<400> 84

Met Leu Thr Leu Ala Ala Leu Leu Ile Ser Val Ser Leu Val Glu Pro  
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Thr Gly Ile Gly Glu Phe Leu Ala Gln Pro Ala Pro Ala Tyr Ala Arg  
 20 25 30

Arg Leu Thr Gly Gln Ala Leu Val Asp Tyr Val Asn Ser His His Ser  
 35 40 45

Leu Tyr Lys Ala Lys Tyr Ser Pro Asp Ala Gln Glu Arg Met Lys Ser  
 50 55 60

Arg Ile Met Asp Leu Ser Phe Met Val Asp Ala Glu Val Met Met Glu  
 65 70 75 80

Glu Met Asp Gln Gln Glu Asp Ile Asp Leu Ala Val Ser Leu Pro Glu  
 85 90 95

Ser Phe Asp Ala Arg Glu Lys Trp Pro Glu Cys Pro Ser Ile Gly Leu  
 100 105 110

Ile Arg Asp Gln Ser Ala Gly Gly Gly Cys Trp Ala Val Ser Ser Ala  
 115 120 125

Glu Val Met Thr Asp Arg Ile Cys Ile Gln Ser Asn Gly Thr Lys Gln  
 130 135 140

Val Tyr Val Ser Glu Thr Asp Ile Leu Ser Cys Cys Gly Gln Arg Cys  
 145 150 155 160

Gly ser Gly Cys Thr Ser Gly Val Pro Arg Gln Ala Phe Asn Tyr Ala  
 165 170 175

US seq list.ST25.txt

Ile Arg Lys Gly Val Cys Ser Gly Gly Pro Tyr Gly Thr Lys Gly Val  
180 185 190

Cys Lys Pro Tyr Pro Phe Tyr Pro Cys Gly Tyr His Ala His Leu Pro  
195 200 205

Tyr Tyr Gly Pro Cys Pro Asp Gly Met Trp Pro Thr Pro Thr Cys Glu  
210 215 220

Lys Ala Cys Gln Ser Asp Tyr Thr Val Pro Tyr Asn Asp Asp Arg Ile  
225 230 235 240

Phe Gly Ser Lys Thr Ile Val Leu Thr Gly Glu Glu Lys Ile Lys Arg  
245 250 255

Glu Ile Phe Asn Asn Gly Pro Leu Val Ala Thr Tyr Thr Val Tyr Glu  
260 265 270

Asp Phe Ala Tyr Tyr Lys Asn Gly Ile Tyr Met Thr Gly Leu Gly Arg  
275 280 285

Ala Thr Gly Ala His Ala Val Lys Ile Ile Gly Trp Gly Glu Glu Asn  
290 295 300

Gly Val Lys Tyr Trp Leu Ile Ala Asn Ser Trp Asn Thr Asp Trp Gly  
305 310 315 320

Glu Asn Gly Phe Phe Arg Met Leu Arg Gly Thr Asn Leu Cys Asp Ile  
325 330 335

Glu Leu Ser Ala Thr Gly Gly Thr Phe Lys Val  
340 345

<210> 85  
<211> 1177  
<212> DNA  
<213> Necator americanus

<400> 85  
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tatctggaac agccgatacc agaggaggca gagaatcttt ccggagaagc gtttgcggag 120  
tttctgaaca aacgacaatc gtttttcacg gctaagtaca cgccaaatgc tttaaacatt 180  
cttaaaatgc gtgtgatgga atcgagattc ctggacaatg aagaaggatga aatgctaaaa 240  
gaggaggaca tggatttcag tgaagaaatt cctgttagtt ttgatgctcg agacaaatgg 300  
cccaaagcga cctccatagg atttatccgt gatcaatcac actgtgggtc atgctgggca 360

US seq list.ST25.txt

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gtatcgtcag cagaaacgat gtcagatcga ctctgcgtgc aatcaaacgg tacaattaag 420
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ggaggccaca caattcgagc gtgggaatat tttagaaca caggcgtttg cactggcgga 540
ctatatggaa caaaggattc ctgcaaacca tacgctttct atccatgtaa agacgaaagt 600
tacggaaagt gcccgaagga ttcttttcca acacaaaat gtcgaaaaat ttgtcagtat 660
aaatacagta agaagtacgc cgacgacaaa tactacgcga attccgcata tcgaattcca 720
cagaatgaga cgtggatcaa attggagatc atgagaaacg ggcctgtgac agcatcattc 780
aggatttatc cggattttgg gttttacgaa aaaggagttt atgtgacttc aggcggaagg 840
gaactagggtg ggcacgcgat taaaatcatt ggatggggaa cggaaaaagt aaacggaact 900
gacctacctt actggttgat tgctaactct tggggtactg actggggaga gaataacggc 960
tatttccgca tacttcgcgg acaaaatcac tgccaaatag aacagaaagt tatcgccggt 1020
atgataaaag taccacaacc gaaatccgcc ggtccaccac ttcaaccaa tccttcaagc 1080
tgaaccaagt tgtagtattg tccccatcaa tccaagcatt tcttggggtg atacttttac 1140
gaataaaaac tacattataa aaaaaaaaaa aaaaaaa 1177

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<210> 86  
 <211> 360  
 <212> PRT  
 <213> Necator americanus

<400> 86

Leu Ile Leu Ile Ala Leu Val Val Thr Ala Leu Ala Gln Gln Pro Leu  
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 20 25 30

Leu Ser Gly Glu Ala Phe Ala Glu Phe Leu Asn Lys Arg Gln Ser Phe  
 35 40 45

Phe Thr Ala Lys Tyr Thr Pro Asn Ala Leu Asn Ile Leu Lys Met Arg  
 50 55 60

Val Met Glu Ser Arg Phe Leu Asp Asn Glu Glu Gly Glu Met Leu Lys  
 65 70 75 80

Glu Glu Asp Met Asp Phe Ser Glu Glu Ile Pro Val Ser Phe Asp Ala  
 85 90 95

Arg Asp Lys Trp Pro Lys Cys Thr Ser Ile Gly Phe Ile Arg Asp Gln  
 100 105 110

US seq list.ST25.txt

Ser His Cys Gly Ser Cys Trp Ala Val Ser Ser Ala Glu Thr Met Ser  
115 120 125

Asp Arg Leu Cys Val Gln Ser Asn Gly Thr Ile Lys Val Leu Leu Ser  
130 135 140

Asp Thr Asp Ile Leu Ala Cys Cys Pro Asn Cys Gly Ala Gly Cys Gly  
145 150 155 160

Gly Gly His Thr Ile Arg Ala Trp Glu Tyr Phe Lys Asn Thr Gly Val  
165 170 175

Cys Thr Gly Gly Leu Tyr Gly Thr Lys Asp Ser Cys Lys Pro Tyr Ala  
180 185 190

Phe Tyr Pro Cys Lys Asp Glu Ser Tyr Gly Lys Cys Pro Lys Asp Ser  
195 200 205

Phe Pro Thr Pro Lys Cys Arg Lys Ile Cys Gln Tyr Lys Tyr Ser Lys  
210 215 220

Lys Tyr Ala Asp Asp Lys Tyr Tyr Ala Asn Ser Ala Tyr Arg Ile Pro  
225 230 235 240

Gln Asn Glu Thr Trp Ile Lys Leu Glu Ile Met Arg Asn Gly Pro Val  
245 250 255

Thr Ala Ser Phe Arg Ile Tyr Pro Asp Phe Gly Phe Tyr Glu Lys Gly  
260 265 270

Val Tyr Val Thr Ser Gly Gly Arg Glu Leu Gly Gly His Ala Ile Lys  
275 280 285

Ile Ile Gly Trp Gly Thr Glu Lys Val Asn Gly Thr Asp Leu Pro Tyr  
290 295 300

Trp Leu Ile Ala Asn Ser Trp Gly Thr Asp Trp Gly Glu Asn Asn Gly  
305 310 315 320

Tyr Phe Arg Ile Leu Arg Gly Gln Asn His Cys Gln Ile Glu Gln Lys  
325 330 335

Val Ile Ala Gly Met Ile Lys Val Pro Gln Pro Lys Ser Ala Gly Pro  
340 345 350

Pro Leu Gln Pro Asn Pro Ser Ser  
355 360

US seq list.ST25.txt

<210> 87  
 <211> 1181  
 <212> DNA  
 <213> Necator americanus

<400> 87  
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 tgaatcgtgg aacagtcaat ctacttttg tgagatccaa tgaaagctaa ttttgcgttg 120  
 gtcgtcgtcc ttctggcaat aaaccagtta tatgcagatg agctgcttca caaacaagag 180  
 tccgaacacg gacttagtgg ccaagcgctc gttgactacg ttaattcgca ccaatcactt 240  
 ttcaaaacag aatattcgcc aaccaatgaa caattcgta aagcccgtat aatggacata 300  
 aagtatatga ctgaggctag ccacaaatat ccaagaaaagg gcattaatct gaacggtgaa 360  
 ctccctgaaa ggtttgacgc acgtgaaaaa tggccacatt gcgcctccat cgggtctcatt 420  
 cgcgatcact ctgcttgagg atcgtgttgg gctgtatcgg cagcgtcggt tatgtcagat 480  
 cgactctgta tccagacgaa cggcacaac cagaagatcc tttcgtcggc ggacatcctt 540  
 gcgtgttgtg gagaagactg tggctcagga tgcgaaggcg gttatccgat tcaggcgtac 600  
 ttctacctgg aaaatactgg agtatgtagt ggaggagagt atcgagaaaa gaatgtatgc 660  
 aaaccatatc ctttttatcc gtgtgacgga aactatggac catgccccaa ggaggggtgcg 720  
 ttcgacactc caaagtgtcg gaaaatatgt cagttccgat atcctgttcc atacgaagaa 780  
 gataaagtgt ttggaaaaaa ttcacacatc cttctgcaag acaacgaggc aagaatcaga 840  
 caggaaattt tcataaacgg accagtggga gctaattttt acgttttcga agactttata 900  
 cactacaagg aagggtatta taagcagaca tatgggaaat ggataggagt acatgcaatc 960  
 aaacttattg gttggggcac agaaaatgga acagattatt ggttggttgc taactcgtac 1020  
 aactacgact ggggagagaa tggcaccttc cgcattcttc gtggaactaa tcactgtttg 1080  
 atagaatcac aagtgatcgc aacggagatg attgtatgaa tgtctaata acgattggtc 1140  
 gcatgccgat ctctgaagta aaatgtgtta atcaaaaaaa a 1181

<210> 88  
 <211> 339  
 <212> PRT  
 <213> Necator americanus

<400> 88

Met Lys Ala Asn Phe Ala Leu Val Val Val Leu Leu Ala Ile Asn Gln  
 1 5 10 15

Leu Tyr Ala Asp Glu Leu Leu His Lys Gln Glu Ser Glu His Gly Leu  
 20 25 30

US seq list.ST25.txt

Ser Gly Gln Ala Leu Val Asp Tyr Val Asn Ser His Gln Ser Leu Phe  
35 40 45

Lys Thr Glu Tyr Ser Pro Thr Asn Glu Gln Phe Val Lys Ala Arg Ile  
50 55 60

Met Asp Ile Lys Tyr Met Thr Glu Ala Ser His Lys Tyr Pro Arg Lys  
65 70 75 80

Gly Ile Asn Leu Asn Val Glu Leu Pro Glu Arg Phe Asp Ala Arg Glu  
85 90 95

Lys Trp Pro His Cys Ala Ser Ile Gly Leu Ile Arg Asp His Ser Ala  
100 105 110

Cys Gly Ser Cys Trp Ala Val Ser Ala Ala Ser Val Met Ser Asp Arg  
115 120 125

Leu Cys Ile Gln Thr Asn Gly Thr Asn Gln Lys Ile Leu Ser Ser Ala  
130 135 140

Asp Ile Leu Ala Cys Cys Gly Glu Asp Cys Gly Ser Gly Cys Glu Gly  
145 150 155 160

Gly Tyr Pro Ile Gln Ala Tyr Phe Tyr Leu Glu Asn Thr Gly Val Cys  
165 170 175

Ser Gly Gly Glu Tyr Arg Glu Lys Asn Val Cys Lys Pro Tyr Pro Phe  
180 185 190

Tyr Pro Cys Asp Gly Asn Tyr Gly Pro Cys Pro Lys Glu Gly Ala Phe  
195 200 205

Asp Thr Pro Lys Cys Arg Lys Ile Cys Gln Phe Arg Tyr Pro Val Pro  
210 215 220

Tyr Glu Glu Asp Lys Val Phe Gly Lys Asn Ser His Ile Leu Leu Gln  
225 230 235 240

Asp Asn Glu Ala Arg Ile Arg Gln Glu Ile Phe Ile Asn Gly Pro Val  
245 250 255

Gly Ala Asn Phe Tyr Val Phe Glu Asp Phe Ile His Tyr Lys Glu Gly  
260 265 270

Ile Tyr Lys Gln Thr Tyr Gly Lys Trp Ile Gly Val His Ala Ile Lys  
275 280 285



US seq list.ST25.txt

Leu Ile Gly Trp Gly Thr Glu Asn Gly Thr Asp Tyr Trp Leu Val Ala  
290 295 300

Asn Ser Tyr Asn Tyr Asp Trp Gly Glu Asn Gly Thr Phe Arg Ile Leu  
305 310 315 320

Arg Gly Thr Asn His Cys Leu Ile Glu Ser Gln Val Ile Ala Thr Glu  
325 330 335

Met Ile Val

<210> 89  
<211> 1236  
<212> DNA  
<213> Necator americanus

<400> 89  
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tcagcgctgt aaacacgtgc aaaactactc gttcatttct cttcactttc cctccaaaac 120  
caaacattca agagaagcat gataaccatc attaccctat tgcttatcgc ttctacagtg 180  
aagtcactaa cagtggagga gtacttggcc cgaccagtgc cggaatatgc cacaaaactg 240  
acaggacaag cctacgttga ctatgttaat cagcatcaat cattctacaa ggctgaatat 300  
tccccgctgg ttgaacagta tgccaaagct gtgatgagat ctgagtttat gacgaagccg 360  
aaccaaaatt atgtggtgaa ggacgtagat ctaaacaatca atcttccaga aaccttcgac 420  
gcaagggaaa aatggccaaa ctgcacatca ataaggacaa ttcgcgatca gtccaattgt 480  
ggatcatgtt gggcagatc agcggcgctc gtaatgtcag atcgtttatg catacagtcg 540  
aacggcacia tacagtcatg ggcttctgat acggatattc tatcatgttg ctggaattgc 600  
ggaatgggat gcgatggagg tagaccgttt gcggcgttct ttttcgcgat agacaatggt 660  
gtatgcactg gaggacctt cagagagcca aacgtgtgca aaccatacgc tttctatcca 720  
tgcggtcgcc accaaaacca gaaatacttc ggaccttgct caaaagagct ctggcccact 780  
ccaaaatgtc ggaaaatgtg tcaactaaaa tataatgtgg cctacaaaga cgataaaatt 840  
tacgggaatg atgcatacag tctccctaac aatgagacac gaatcatgca agaaattttc 900  
acaaatggac ctgtagtggg atcattcagc gtgtttgctg actttgcaat ttataagaaa 960  
ggagtatatg tgagtaatgg aattcagcag aatggggctc atgcagtcaa aattattggt 1020  
tgggggtgtg aggatggact aaaatattgg ttgattgcta attcctggaa caatgactgg 1080  
ggagacgaag gctatgtccg gttccttcgt ggagataacc actgtggaat tgaatcaagg 1140  
gtggtgacag gaactatgaa agtgtaaaac aataattagt cttttcctga cgatttcaaa 1200

## US seq list.ST25.txt

taaaatcttt gccactaaaa aaaaaaaaaa aaaaaa

1236

<210> 90  
 <211> 342  
 <212> PRT  
 <213> Necator americanus

&lt;400&gt; 90

Met Ile Thr Ile Ile Thr Leu Leu Leu Ile Ala Ser Thr Val Lys Ser  
 1 5 10 15

Leu Thr Val Glu Glu Tyr Leu Ala Arg Pro Val Pro Glu Tyr Ala Thr  
 20 25 30

Lys Leu Thr Gly Gln Ala Tyr Val Asp Tyr Val Asn Gln His Gln Ser  
 35 40 45

Phe Tyr Lys Ala Glu Tyr Ser Pro Leu Val Glu Gln Tyr Ala Lys Ala  
 50 55 60

Val Met Arg Ser Glu Phe Met Thr Lys Pro Asn Gln Asn Tyr Val Val  
 65 70 75 80

Lys Asp Val Asp Leu Asn Ile Asn Leu Pro Glu Thr Phe Asp Ala Arg  
 85 90 95

Glu Lys Trp Pro Asn Cys Thr Ser Ile Arg Thr Ile Arg Asp Gln Ser  
 100 105 110

Asn Cys Gly Ser Cys Trp Ala Val Ser Ala Ala Ser Val Met Ser Asp  
 115 120 125

Arg Leu Cys Ile Gln Ser Asn Gly Thr Ile Gln Ser Trp Ala Ser Asp  
 130 135 140

Thr Asp Ile Leu Ser Cys Cys Trp Asn Cys Gly Met Gly Cys Asp Gly  
 145 150 155 160

Gly Arg Pro Phe Ala Ala Phe Phe Phe Ala Ile Asp Asn Gly Val Cys  
 165 170 175

Thr Gly Gly Pro Phe Arg Glu Pro Asn Val Cys Lys Pro Tyr Ala Phe  
 180 185 190

Tyr Pro Cys Gly Arg His Gln Asn Gln Lys Tyr Phe Gly Pro Cys Pro  
 195 200 205

US seq list.ST25.txt

Lys Glu Leu Trp Pro Thr Pro Lys Cys Arg Lys Met Cys Gln Leu Lys  
210 215 220

Tyr Asn Val Ala Tyr Lys Asp Asp Lys Ile Tyr Gly Asn Asp Ala Tyr  
225 230 235 240

Ser Leu Pro Asn Asn Glu Thr Arg Ile Met Gln Glu Ile Phe Thr Asn  
245 250 255

Gly Pro Val Val Gly Ser Phe Ser Val Phe Ala Asp Phe Ala Ile Tyr  
260 265 270

Lys Lys Gly Val Tyr Val Ser Asn Gly Ile Gln Gln Asn Gly Ala His  
275 280 285

Ala Val Lys Ile Ile Gly Trp Gly Val Gln Asp Gly Leu Lys Tyr Trp  
290 295 300

Leu Ile Ala Asn Ser Trp Asn Asn Asp Trp Gly Asp Glu Gly Tyr Val  
305 310 315 320

Arg Phe Leu Arg Gly Asp Asn His Cys Gly Ile Glu Ser Arg Val Val  
325 330 335

Thr Gly Thr Met Lys Val  
340

<210> 91  
<211> 2709  
<212> DNA  
<213> Necator americanus

<400> 91  
attttcaatg accaagctcc tcgtaagcac cgccgggttg actggcgctcg tcgcggccct 60  
cttcatcact tctctggttt tcagcatcct tacatggaca cgtgtaaaaa atgacaacga 120  
taaccaccca agacctaagg agccactcag tcgtccagta gtgcaattgt cttcatctat 180  
tcagactacc gtaaccgaaa atgtagtgac agaaccata gtgactgtgc cgacagtgtc 240  
acgcaccaga gtttcggcaa aaacaatatc accgagaagt tccgcgacaa cgtcaactcg 300  
aacgcttcga actctcacca caccgaaatt cgtcgcaacg gaggccgcac cgcgacgtaa 360  
tcgtacgata atgtgtccga actatggagt ttcagacaac tcatacgcac accaggaagc 420  
agcatcggtc attcttagtg gcctcgacga acgtgtcaat ccgtgcgaag atttctacgc 480  
tttacttgt aacaagtttc taaaagatca taaggctgaa gaacatgggg tcagtcgtta 540  
cggagctata aaagaacttc aagatgcagt gaacacagaa atagttgacg ccctcttcga 600  
tgtggatgtg aacgataaga agcggtcaga aacagagaga ataacgaaag cgcttctcca 660

US seq list.ST25.txt

cgactgcgtt taccacatct cgcctaattgt tccgaccgaa acaatcatta atttccttga	720
agaaattgca agaattgtttg gaggtataacc gttcctcaac cacactctaa aagaagattt	780
tgacgttttc gctgcaatgg gagaagtcga acaaaatcac gcgatgggta cgcttttcag	840
cgcaatgggt tcggtcgact acaagaagat caaacagaat tcactgttct taccacagcc	900
tcggcttccg atgccaagag aattctacgt gttccacag ttacgatga agcttaaaaa	960
acgtggactt caaattgctg acgtttttaa gaaatttgcc gagaagatct tagaagaacc	1020
cgataagtat agggatatga tagaaaaggc tgcgcaagat gttgtggaac tagagaggag	1080
gatcgctctg gcgtcttggg cagatgccga aatgagaaac tacgcacaac agtacaatcc	1140
ctacgatctg cccactttga aaaaggcgta tccatctgtc aaatgggaga gctatctacg	1200
tagccttttg tcaaccgtcg gtccagtcga tttttctggt ccacataaac ggctcataat	1260
ctcgaaccg tcgtattttg ggtggttgaa tgctctcttc aatggtaacg ttgttgacga	1320
aaatacgata gtaaactata taatcacgca cttaatcttc gaagatgcgg aattccttgg	1380
tggtatattt aaagaatctg cagaggattt aaattacgtc cggatgcgc agagaagtgg	1440
cagaggagtt gcccagttg gaaggcaact tatgcatcaa agagatacca ggggcgaccc	1500
gaatatcccg tgcataaatt tcatcatgac gtacatgccg tatggacctg gttatgtcta	1560
tgtaagaagc aaacagcaga gaaacgatgt tcaagcagac attaggaaac aaacagaact	1620
cgatcatcgag agctttctga atatgacttc gggcctgaag tggatgtctt cggattcgaa	1680
agaaaaagct agacagaagg ctaagggtat ggtgaggaac tacggatggc ctcaaaaact	1740
cttcggagac tttaaaagca gcgaagagat tgatgaatat cacaagaagg attatgctga	1800
aatccttgag cttaccaaga cggagaggag cagccttcga tattaccgta tgcgccgggt	1860
gctgattaaa ggatattcaa atcgcgagtc actgcgttta cttttgcagg atgcagacag	1920
gtccaatttc ctctatcac cagcgtagt gagcgcttg taccagccgg aaaggaactc	1980
tatcactttc cttacgcga gcttcaatcc accgtactat agctatgaat atcctcaagc	2040
ttacaactat ggtggtcagg gtggaactgc cggatcatg ctagtccatg gatttgacga	2100
ccaaggagtg cagttcggtc ccgatggaag tctaagtagg tgtacgtgg atgattgtgg	2160
atggatggat aaaagatcaa aagatgggtt caacgacatg gcccaatgtg ttgtaacaca	2220
ttatagcact ttctgctgcc cagaacagga aggtaatata cactgcgcaa atggtgcaac	2280
cacacaagg gaaaatattg ctgatattgg aggtgaacat gctgcataca tagcatatcg	2340
agagtacatc aaatcactag gacatgaaga gaaaagattg ccaggattag aacgatacac	2400
accaaaccag atcttttggg ttacatatgg atactcatgg tgcaggagcg taacagagga	2460
ataccttatt agtcaacttc tcaccgaccc ccacgcacca agtgcttgcc gcactaacca	2520

US seq list.ST25.txt

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agtagtccaa agtatccctg cgtttggacg ggatttcggg tgctcattag gagacagaat 2580
gtatcctgca ccagagcagc gatgttcagt ttgggttcaa gagtaaattg tcggacgaaa 2640
ctgtcggatt ttatgtttca gtcggattat aacactatca actaaacatt tcgttcaaaa 2700
aaaaaaaaa 2709

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<210> 92  
 <211> 878  
 <212> PRT  
 <213> Necator americanus

<400> 92

Met Thr Lys Leu Leu Val Ser Thr Ala Gly Leu Thr Gly Val Val Ala  
 1 5 10 15

Ala Leu Phe Ile Thr Ser Leu Val Phe Ser Ile Leu Thr Trp Thr Arg  
 20 25 30

Val Lys Asn Asp Asn Asp Asn Pro Pro Arg Pro Lys Glu Pro Leu Ser  
 35 40 45

Arg Pro Val Val Gln Leu Ser Ser Ser Ile Gln Thr Thr Val Thr Glu  
 50 55 60

Asn Val Val Thr Glu Pro Ile Val Thr Val Pro Thr Val Ser Arg Thr  
 65 70 75 80

Arg Val Ser Ala Lys Thr Ile Ser Pro Arg Ser Ser Ala Thr Thr Ser  
 85 90 95

Thr Arg Thr Leu Arg Thr Leu Thr Thr Pro Lys Phe Val Ala Thr Glu  
 100 105 110

Ala Ala Pro Arg Arg Asn Arg Thr Ile Met Cys Pro Asn Tyr Gly Val  
 115 120 125

Ser Asp Asn Ser Tyr Ala Tyr Gln Glu Ala Ala Ser Phe Ile Leu Ser  
 130 135 140

Gly Leu Asp Glu Arg Val Asn Pro Cys Glu Asp Phe Tyr Ala Phe Thr  
 145 150 155 160

Cys Asn Lys Phe Leu Lys Asp His Lys Ala Glu Glu His Gly Val Ser  
 165 170 175

Arg Tyr Gly Ala Ile Lys Glu Leu Gln Asp Ala Val Asn Thr Glu Ile  
 180 185 190

US seq list.ST25.txt

Val Asp Ala Leu Phe Asp Val Asp Val Asn Asp Lys Lys Arg Ser Glu  
195 200 205

Thr Glu Arg Ile Thr Lys Ala Leu Leu His Asp Cys Val Tyr His Ile  
210 215 220

Ser Pro Asn Val Pro Thr Glu Thr Ile Ile Asn Phe Leu Glu Glu Ile  
225 230 235 240

Ala Arg Met Phe Gly Gly Ile Pro Phe Leu Asn His Thr Leu Lys Glu  
245 250 255

Asp Phe Asp Val Phe Ala Ala Met Gly Glu Val Glu Gln Asn His Ala  
260 265 270

Met Gly Thr Leu Phe Ser Ala Met Val Ser Val Asp Tyr Lys Lys Ile  
275 280 285

Lys Gln Asn Ser Leu Phe Leu Ser Gln Pro Arg Leu Pro Met Pro Arg  
290 295 300

Glu Phe Tyr Val Leu Pro Gln Phe Thr Met Lys Leu Lys Lys Arg Gly  
305 310 315 320

Leu Gln Ile Ala Asp Val Leu Lys Lys Phe Ala Glu Lys Ile Leu Glu  
325 330 335

Glu Pro Asp Lys Tyr Arg Asp Met Ile Glu Lys Ala Ala Gln Asp Val  
340 345 350

Val Glu Leu Glu Arg Arg Ile Ala Leu Ala Ser Trp Ala Asp Ala Glu  
355 360 365

Met Arg Asn Tyr Ala Gln Gln Tyr Asn Pro Tyr Asp Leu Pro Thr Leu  
370 375 380

Lys Lys Ala Tyr Pro Ser Val Lys Trp Glu Ser Tyr Leu Arg Ser Leu  
385 390 395 400

Leu Ser Thr Val Gly Pro Val Asp Phe Ser Gly Pro His Lys Arg Leu  
405 410 415

Ile Ile Ser Gln Pro Ser Tyr Phe Gly Trp Leu Asn Ala Leu Phe Asn  
420 425 430

Gly Asn Val Val Asp Glu Asn Thr Ile Val Asn Tyr Ile Ile Thr His  
435 440 445

US seq list.ST25.txt

Leu Ile Phe Glu Asp Ala Glu Phe Leu Gly Gly Ile Phe Lys Glu Ser  
 450 455 460  
 Ala Glu Asp Leu Asn Tyr Val Arg Tyr Ala Gln Arg Ser Gly Arg Gly  
 465 470 475 480  
 Val Ala Arg Val Gly Arg Gln Leu Met His Gln Arg Asp Thr Arg Gly  
 485 490 495  
 Asp Pro Asn Ile Pro Cys Met Asn Phe Ile Met Thr Tyr Met Pro Tyr  
 500 505 510  
 Gly Pro Gly Tyr Val Tyr Val Arg Ser Lys Gln Gln Arg Asn Asp Val  
 515 520 525  
 Gln Ala Asp Ile Arg Lys Gln Thr Glu Leu Val Ile Glu Ser Phe Leu  
 530 535 540  
 Asn Met Thr Ser Gly Leu Lys Trp Met Ser Ser Asp Ser Lys Glu Lys  
 545 550 555 560  
 Ala Arg Gln Lys Ala Lys Gly Met Val Arg Asn Tyr Gly Trp Pro Gln  
 565 570 575  
 Lys Leu Phe Gly Asp Phe Lys Ser Ser Glu Glu Ile Asp Glu Tyr His  
 580 585 590  
 Lys Lys Asp Tyr Ala Glu Ile Leu Glu Leu Thr Lys Thr Glu Arg Ser  
 595 600 605  
 Ser Leu Arg Tyr Tyr Arg Met Arg Arg Val Leu Ile Lys Gly Tyr Ser  
 610 615 620  
 Asn Arg Glu Ser Leu Arg Leu Leu Leu Gln Asp Ala Asp Arg Ser Asn  
 625 630 635 640  
 Phe Leu Leu Ser Pro Ala Leu Val Ser Ala Trp Tyr Gln Pro Glu Arg  
 645 650 655  
 Asn Ser Ile Thr Phe Pro Tyr Ala Ser Phe Asn Pro Pro Tyr Tyr Ser  
 660 665 670  
 Tyr Glu Tyr Pro Gln Ala Tyr Asn Tyr Gly Gly Gln Gly Gly Thr Ala  
 675 680 685  
 Gly His Glu Leu Val His Gly Phe Asp Asp Gln Gly Val Gln Phe Gly

US seq list.ST25.txt  
700

690

695

Pro Asp Gly Ser Leu Ser Arg Cys Thr Ser Glu Gln Ile Asp Asn Trp  
705 710 715 720

Tyr Asp Cys Gly Trp Met Asp Lys Arg Ser Lys Asp Gly Phe Asn Asp  
725 730 735

Met Ala Gln Cys Val Val Thr His Tyr Ser Thr Phe Cys Cys Pro Glu  
740 745 750

Gln Glu Gly Asn Ile His Cys Ala Asn Gly Ala Thr Thr Gln Gly Glu  
755 760 765

Asn Ile Ala Asp Ile Gly Gly Glu His Ala Ala Tyr Ile Ala Tyr Arg  
770 775 780

Glu Tyr Ile Lys Ser Leu Gly His Glu Glu Lys Arg Leu Pro Gly Leu  
785 790 795 800

Glu Arg Tyr Thr Pro Asn Gln Ile Phe Trp Ile Thr Tyr Gly Tyr Ser  
805 810 815

Trp Cys Arg Ser Val Thr Glu Glu Tyr Leu Ile Ser Gln Leu Leu Thr  
820 825 830

Asp Pro His Ala Pro Ser Ala Cys Arg Thr Asn Gln Val Val Gln Ser  
835 840 845

Ile Pro Ala Phe Gly Arg Asp Phe Gly Cys Ser Leu Gly Asp Arg Met  
850 855 860

Tyr Pro Ala Pro Glu Gln Arg Cys Ser Val Trp Val Gln Glu  
865 870 875

<210> 93  
<211> 551  
<212> DNA  
<213> Ancylostoma caninum

<400> 93  
gaaaagccta cgagtcacg ctcaaactcg tcgccctagc ctgcttagct gcgatctgcc 60  
tcgctcaggg tggacccgaa ggacccctc ctttcctgaa gagtgctccc cccgagaagg 120  
tgaaggaatt cgacgctctt ttcgccgatg ctggagggtct gactgatgcc cagatcgacg 180  
ctaaggtcaa gggatggatc ggaaagcaga gtcaggatat ccagaacgca ttcaatgcct 240  
tcgagagtga ggtgaaagcc gccagcaac aggggtgagca agctcaccag gctgctgtcg 300



US seq list.ST25.txt

ccaaattcag cgctgaagcc aaggctgccg acgccaagct caccgctatc gccaatgacg	360
cctccaagac gaatgcacag aaggagccg agatcgacgc cgttctcaag ggtcttcac	420
aaaaagtccg tgatgaaatc gagaatgcaa tgaaggata agagggcggtt gttttgtata	480
tatgaaccga taaatatgca aaataaatat ctcccccttca aaaaaaaaaa aaaaaaaaaa	540
aaaaaaaaaa a	551

<210> 94  
 <211> 147  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 94

Met Leu Lys Leu Val Ala Leu Ala Cys Leu Ala Ala Ile Cys Leu Ala  
 1 5 10 15

Gln Gly Gly Pro Glu Gly Pro Pro Pro Phe Leu Lys Ser Ala Pro Pro  
 20 25 30

Glu Lys Val Lys Glu Phe Asp Ala Leu Phe Ala Asp Ala Gly Gly Leu  
 35 40 45

Thr Asp Ala Gln Ile Asp Ala Lys Val Lys Gly Trp Ile Gly Lys Gln  
 50 55 60

Ser Gln Asp Ile Gln Asn Ala Phe Asn Ala Phe Glu Ser Glu Val Lys  
 65 70 75 80

Ala Ala Gln Gln Gln Gly Glu Gln Ala His Gln Ala Ala Val Ala Lys  
 85 90 95

Phe Ser Ala Glu Ala Lys Ala Ala Asp Ala Lys Leu Thr Ala Ile Ala  
 100 105 110

Asn Asp Ala Ser Lys Thr Asn Ala Gln Lys Gly Ala Glu Ile Asp Ala  
 115 120 125

Val Leu Lys Gly Leu Pro Gln Lys Val Arg Asp Glu Ile Glu Asn Ala  
 130 135 140

Met Lys Gly  
 145

<210> 95  
 <211> 482  
 <212> DNA  
 <213> Ancylostoma ceylanicum

US seq list.ST25.txt

<400> 95  
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gacccgaggg accccctcct ttcctgaaga gtgctcccc cgagaaagtg aaggaattcg 120  
acgctctttt cgccgatgct ggaggtctga ctgatgccca gatcgacgct aagggtcaagg 180  
gatggatcgg aaagcagagc caggacatcc agaatgcatt caatgccttc gagagtgagg 240  
tgaaagccgc ccagcaacag ggtgagcaag ctaccaggc tgctgtcgcc aaattcagcg 300  
ctgaggccaa ggctgccgac gccaaactca ccgctatcgc caatgacgcc tccaagacga 360  
atgcgagaa gggagccgag atcgacgccg ttctcaaggg tcttcacaa aaagtccgtg 420  
atgaaatcga gaatgcaatg aagggataag agggcgttgt tttgtatata tgaaccgata 480  
aa 482

<210> 96  
<211> 147  
<212> PRT  
<213> Ancylostoma ceylanicum

<400> 96

Met Leu Lys Leu Val Ala Leu Ala Cys Leu Ala Ala Ile Cys Leu Ala  
1 5 10 15  
Gln Gly Gly Pro Glu Gly Pro Pro Pro Phe Leu Lys Ser Ala Pro Pro  
20 25 30  
Glu Lys Val Lys Glu Phe Asp Ala Leu Phe Ala Asp Ala Gly Gly Leu  
35 40 45  
Thr Asp Ala Gln Ile Asp Ala Lys Val Lys Gly Trp Ile Gly Lys Gln  
50 55 60  
Ser Gln Asp Ile Gln Asn Ala Phe Asn Ala Phe Glu Ser Glu Val Lys  
65 70 75 80  
Ala Ala Gln Gln Gln Gly Glu Gln Ala His Gln Ala Ala Val Ala Lys  
85 90 95  
Phe Ser Ala Glu Ala Lys Ala Ala Asp Ala Lys Leu Thr Ala Ile Ala  
100 105 110  
Asn Asp Ala Ser Lys Thr Asn Ala Gln Lys Gly Ala Glu Ile Asp Ala  
115 120 125  
Val Leu Lys Gly Leu Pro Gln Lys Val Arg Asp Glu Ile Glu Asn Ala  
130 135 140

## US seq list.ST25.txt

Met Lys Gly  
145

<210> 97  
<211> 1093  
<212> DNA  
<213> Ancylostoma caninum

<400> 97  
tttgagatgt ggattctcgc tgcattagt gtaacggcac ttgccgcaaa accgactacg 60  
gttgaggagt tccacgctca acctatagag gagcacgtta aagacctcag tggacaagct 120  
tttgttgact acatcaacga gcatcaatct ttctataggg cggaatattc accagaggcg 180  
gaagcgttcg tgaaagctcg gataatggac tcgaagtatt tagtggaaacc taagaaagaa 240  
gaagtgctgg aggacgtata tggcaatgat ccgcctgcga gcttcgacgc tcgcacccac 300  
tggcctgaat gcagatccat tggcaccatt cgtgaccagt catcatgcgg ttcattgttg 360  
gcagtatcct cagcggaaagc catgtcggat gaaatatgtg ttcagtcgaa cagtacgata 420  
aggggtgatga tttccgactc agatatactc tcgtgctgtg gaatttcctg tggatatgga 480  
tgccaagggtg gttggccgat cgaagcatac aaatggatgc aacgtgacgg tgttggtaca 540  
gggtggaaaat acagacagaa gaaagtgtgc aagccgtacg ctttctatcc gtgtgggcac 600  
caccaaaatg acccctacta tggaccttgc ccaggggggtt tatggcccac tccaaaatgt 660  
cgaaagacgt gtcagcgaaa atacaacaag tcctaccaag aagacaagca ctttgcaacg 720  
agggcctact acctcccgaa taatgaaagg aacatcaggc aagagattta caagaacgga 780  
cctgtgggtcg cagctttcag agtctaccag gacttcagtt attacaaaaa aggaatctat 840  
gtgcacaagt ggggtggtca aacaggagca catgctgtca aagtcgttgg ttggggcaga 900  
gaaaatgcaa cagattactg gctgattgcg aactcgtgga acactgactg gggagaaagc 960  
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<210> 98  
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<213> Ancylostoma caninum

<400> 98

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Thr Thr Val Glu Glu Phe His Ala Gln Pro Ile Glu Glu His Val Lys  
20 25 30

US seq list.ST25.txt

Asp Leu Ser Gly Gln Ala Phe Val Asp Tyr Ile Asn Glu His Gln Ser  
 35 40 45  
 Phe Tyr Arg Ala Glu Tyr Ser Pro Glu Ala Glu Ala Phe Val Lys Ala  
 50 55 60  
 Arg Ile Met Asp Ser Lys Tyr Leu Val Glu Pro Lys Lys Glu Glu Val  
 65 70 75 80  
 Leu Glu Asp Val Tyr Gly Asn Asp Pro Pro Ala Ser Phe Asp Ala Arg  
 85 90 95  
 Thr His Trp Pro Glu Cys Arg Ser Ile Gly Thr Ile Arg Asp Gln Ser  
 100 105 110  
 Ser Cys Gly Ser Cys Trp Ala Val Ser Ser Ala Glu Ala Met Ser Asp  
 115 120 125  
 Glu Ile Cys Val Gln Ser Asn Ser Thr Ile Arg Val Met Ile Ser Asp  
 130 135 140  
 Ser Asp Ile Leu Ser Cys Cys Gly Ile Ser Cys Gly Tyr Gly Cys Gln  
 145 150 155 160  
 Gly Gly Trp Pro Ile Glu Ala Tyr Lys Trp Met Gln Arg Asp Gly Val  
 165 170 175  
 Val Thr Gly Gly Lys Tyr Arg Gln Lys Lys Val Cys Lys Pro Tyr Ala  
 180 185 190  
 Phe Tyr Pro Cys Gly His His Gln Asn Asp Pro Tyr Tyr Gly Pro Cys  
 195 200 205  
 Pro Gly Gly Leu Trp Pro Thr Pro Lys Cys Arg Lys Thr Cys Gln Arg  
 210 215 220  
 Lys Tyr Asn Lys Ser Tyr Gln Glu Asp Lys His Phe Ala Thr Arg Ala  
 225 230 235 240  
 Tyr Tyr Leu Pro Asn Asn Glu Arg Asn Ile Arg Gln Glu Ile Tyr Lys  
 245 250 255  
 Asn Gly Pro Val Val Ala Ala Phe Arg Val Tyr Gln Asp Phe Ser Tyr  
 260 265 270  
 Tyr Lys Lys Gly Ile Tyr Val His Lys Trp Gly Gly Gln Thr Gly Ala  
 275 280 285

US seq list.ST25.txt

His Ala Val Lys Val Val Gly Trp Gly Arg Glu Asn Ala Thr Asp Tyr  
290 295 300

Trp Leu Ile Ala Asn Ser Trp Asn Thr Asp Trp Gly Glu Ser Gly Tyr  
305 310 315 320

Phe Arg Ile Val Arg Gly Thr Asn Glu Cys Gly Ile Glu Ala Gln Met  
325 330 335

Val Gly Gly Ala Met Arg Val  
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<210> 99  
<211> 495  
<212> DNA  
<213> Ancylostoma caninum

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gatactgaac acatggctag agcatggaag gccgcaaaag gcatcaatga ggacgcttct 180  
aacgctggac cgtaccacat gattcctatt aagatcgtaa aggccgaatc tcaagttgtc 240  
gctggagtta ggtacatatt tgaagtgtg ttcggcgaat ccacgtgtaa gaaaggacat 300  
atggctgcaa ccgaactttc tgcctccaac tgtgagctga aagaaggagg aaaccgagct 360  
ctatacaaaag ttgagctttg ggagaagcca tgggaaaact tcgagcagtt caacgtggag 420  
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cgccggcgctc tatat 495

<210> 100  
<211> 143  
<212> PRT  
<213> Ancylostoma caninum

<400> 100

Met Pro Tyr Leu Ala Phe Ile Val Ala Leu Leu Ala Cys Thr Val Met  
1 5 10 15

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20 25 30

Asp Pro Glu His Met Ala Arg Ala Trp Lys Ala Ala Lys Gly Ile Asn  
35 40 45

Glu Asp Ala Ser Asn Ala Gly Pro Tyr His Met Ile Pro Ile Lys Ile  
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50

55

Val Lys Ala Glu Ser Gln Val Val Ala Gly Val Arg Tyr Ile Phe Glu  
65 70 75 80

Val Leu Phe Gly Glu Ser Thr Cys Lys Lys Gly His Met Ala Ala Thr  
85 90 95

Glu Leu Ser Ala Ser Asn Cys Glu Leu Lys Glu Gly Gly Asn Arg Ala  
100 105 110

Leu Tyr Lys Val Glu Leu Trp Glu Lys Pro Trp Glu Asn Phe Glu Gln  
115 120 125

Phe Asn Val Glu Lys Ile Arg Asn Val Ala Ala Gly Glu Gln Ile  
130 135 140

<210> 101  
<211> 2540  
<212> DNA  
<213> Ancylostoma caninum

<400> 101  
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acgtctgggt atcggagcta gatacatcac atggtgagcc caaggtaaaa acagagctga 240  
atatagcggc gcctccacag atcactccga acgacaagga aaagtatgat gccgccaagg 300  
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agaataaacc gattgatcct aaactcaagg ataaggtag aggcctggtg gaatttgaac 960  
aaatgatcgc gaacaagtac agcaccgatg atgacacacg ccgaatctac ttgcgatcat 1020

US seq list.ST25.txt

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ccgtcatgga gccgggtcag tacgccaaca tgagtcgtga ttatgctgga tttgacaaag	1200
aaaaactagt gaactacttg tttatgcgcc tgctgctatc taatgctcag tatttgccaa	1260
cctatgccag cagtttcaaa gagatgccgg aagaaccact agttcttgga cggaagcgac	1320
gcaacatcca tttctcaaaa tccgacaccc ttactgatac gcaagcgaat tgtgcaaagg	1380
tggcgaatga gctgatgatg tttgcgaatg gacgagtttt cgtcgactat gtgtatcccg	1440
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atgctttcca aagcatgggt gatcaacttg actggatgag cgaagcgaca aagagaaaag	1560
caatagaaaa gagcatgaat atcataacaa acatagcttt cccggattgg attatggaca	1620
acgcaaagtt ggacctgtat tacaaaagca tcaccttcga cccaaccaag gaaaactact	1680
acgatatttg gacaaagctt accatattca atatagaagc tcagtacaag cacttaacaa	1740
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agaagaactg tattggatgg atggatgagc aatcaacgaa aggtttcaat cgcttggctc	2040
aatgtgtcat cgatgagtat agcacgttct gccctcttga caacaggaca tacacacaa	2100
attgtgtgaa tggagcgcag acccaaggag agaacatcgc cgataatgga ggggtacacg	2160
cggcgttccg cgcttaccgt acacacatct ctctcaatgg accagatcca cagcttcctg	2220
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<210> 102  
 <211> 823  
 <212> PRT  
 <213> Ancylostoma caninum

<400> 102

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US seq list.ST25.txt

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 35 40 45  
 Pro Lys Ser Pro Tyr Ala Pro Asp Lys His Cys Asn Val Trp Val Ser  
 50 55 60  
 Glu Leu Asp Thr Ser His Gly Glu Pro Lys Val Lys Thr Glu Leu Asn  
 65 70 75 80  
 Ile Ala Ala Pro Pro Gln Ile Thr Pro Asn Asp Lys Glu Lys Tyr Asp  
 85 90 95  
 Ala Ala Lys Val Ala Ile Ser Phe Phe Gln Glu Ser Val Asn Thr Ser  
 100 105 110  
 Val Asp Pro Cys Glu Asp Phe Tyr Lys Tyr Ala Cys Gly Lys Tyr Gln  
 115 120 125  
 Lys Ala Val Ser Phe His Tyr Ala Asp Ala Lys Asn Leu Val Ala Met  
 130 135 140  
 Ala Asn Gln Leu Thr Asn Lys Asp Tyr Gln Lys Val Ile Lys Ser Ser  
 145 150 155 160  
 Thr Ala Leu Thr Lys Glu Lys Ala Phe Phe Asp Ala Cys Val Ala Ala  
 165 170 175  
 Thr Lys Asp Ser Gly His Asn Asn Gln Ile Leu Ile Ser Asn Asn Tyr  
 180 185 190  
 Leu Met Lys Arg Val Arg Lys Leu Ala Asp Tyr Leu Gly Ala Glu Phe  
 195 200 205  
 Thr Tyr Ala Leu Gly Gly Arg Val Glu Arg Leu Pro Asn Lys Val Gln  
 210 215 220  
 Leu Ala Asn Ala Leu Gly Tyr Leu Ser Phe Asp Gln Asn Ile Gln Thr  
 225 230 235 240  
 Leu Val Thr Pro Leu Val Asp Thr Tyr Trp Pro Asp Pro Asn Lys Gly  
 245 250 255  
 Tyr Thr Met Phe Leu Asp Gln Asn Thr Ala Tyr Met Ser Lys Thr Phe  
 260 265 270



US seq list.ST25.txt

Tyr His Pro Asp Ala Phe Lys Thr Ile Lys Glu Asn Tyr Ile Asn Ser  
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 Ala Thr Lys Val Ile Glu Thr Phe Val Lys Thr Gln Asn Lys Pro Ile  
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 Asp Pro Lys Leu Lys Asp Lys Val Arg Gly Leu Val Glu Phe Glu Gln  
 305 310 315 320  
 Met Ile Ala Asn Lys Tyr Ser Thr Asp Asp Thr Arg Arg Ile Tyr  
 325 330 335  
 Leu Arg Ser Trp Asn Leu Arg Ser Ile Arg Glu Leu Gln Asn Gln Phe  
 340 345 350  
 Gly Phe Val Asp Trp Gln Thr Tyr Met Lys Met Val Pro Met Val Ala  
 355 360 365  
 Gln Asn Lys Val Gln Ser Ala Asp Phe Arg Val Ser Val Met Glu Pro  
 370 375 380  
 Gly Gln Tyr Ala Asn Met Ser Arg Asp Tyr Ala Gly Phe Asp Lys Glu  
 385 390 395 400  
 Lys Leu Val Asn Tyr Leu Phe Met Arg Leu Leu Leu Ser Asn Ala Gln  
 405 410 415  
 Tyr Leu Pro Thr Tyr Ala Ser Ser Phe Lys Glu Met Pro Glu Glu Pro  
 420 425 430  
 Leu Val Leu Gly Arg Lys Arg Arg Asn Ile His Phe Ser Lys Ser Asp  
 435 440 445  
 Thr Leu Thr Asp Thr Gln Ala Asn Cys Ala Lys Val Ala Asn Glu Leu  
 450 455 460  
 Met Met Phe Ala Asn Gly Arg Val Phe Val Asp Tyr Val Tyr Pro Asp  
 465 470 475 480  
 Glu Lys Tyr Lys Asp Leu Ile Arg Ser Ser Ala Gly Gly Val Met His  
 485 490 495  
 Asn Val Ile His Ala Phe Gln Ser Met Val Asp Gln Leu Asp Trp Met  
 500 505 510

Ser Glu Ala Thr Lys Arg Lys Ala Ile Glu Lys Ser Met Asn Ile Ile  
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520

525

Thr Asn Ile Ala Phe Pro Asp Trp Ile Met Asp Asn Ala Lys Leu Asp  
 530 535 540

Leu Tyr Tyr Lys Ser Ile Thr Phe Asp Pro Thr Lys Glu Asn Tyr Tyr  
 545 550 555 560

Asp Ile Trp Thr Lys Leu Thr Ile Phe Asn Ile Glu Ala Gln Tyr Lys  
 565 570 575

His Leu Thr Met Ala Thr Ala Asp Tyr Glu Glu Phe Leu Met Pro Pro  
 580 585 590

Gly Ile Val Asn Ala Trp Tyr Gln Pro Glu Leu Asn Thr Ile Thr Phe  
 595 600 605

Pro Ala Gly Ile Leu Arg Pro Pro Tyr Phe His Pro Asp Trp Pro Ala  
 610 615 620

Ser Ile Lys Tyr Gly Gly Ile Gly Leu Ile Ala Gly His Glu Leu Ile  
 625 630 635 640

His Gly Phe Asp Asp Gln Gly Val Gln Trp Gly Pro Lys Gly His Ile  
 645 650 655

Ser Tyr Pro Glu Lys Asn Cys Ile Gly Trp Met Asp Glu Gln Ser Thr  
 660 665 670

Lys Gly Phe Asn Arg Leu Ala Gln Cys Val Ile Asp Glu Tyr Ser Thr  
 675 680 685

Phe Cys Pro Leu Asp Asn Arg Thr Tyr Thr Pro Asn Cys Val Asn Gly  
 690 695 700

Ala Gln Thr Gln Gly Glu Asn Ile Ala Asp Asn Gly Gly Val His Ala  
 705 710 715 720

Ala Phe Arg Ala Tyr Arg Thr His Ile Ser Leu Asn Gly Pro Asp Pro  
 725 730 735

Gln Leu Pro Asp Arg Leu Phe Gly Gln Phe Thr His Asp Gln Leu Phe  
 740 745 750

Phe Leu Asn Phe Ala Gln Val Trp Cys Glu Lys Arg Arg Val Asp Asp  
 755 760 765

US seq list.ST25.txt

Arg Leu Tyr Gln Gln Leu Met Val Asp Pro His Ser Pro Ala Met Tyr  
770 775 780

Arg Val Phe Gly Thr Leu Gln Asn Tyr Pro Ala Phe Arg Ala Ala Phe  
785 790 795 800

Asn Cys Pro Leu Asn Ser Arg Tyr Ala Pro Lys Asp His Cys Asn Val  
805 810 815

Trp Val Pro Asn Tyr Met Pro  
820

<210> 103  
<211> 472  
<212> DNA  
<213> Ancylostoma caninum

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gcagaacgtc accgtcaagg ggaccaccat ctgcaacaag aagcgaatgg ccgatgtgac 120  
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tatcatttcc gcagtcgata aggagaagtg ctacatgaac gcgttgtttt ccacggcaat 420  
attttgtata gacagatgaa cattccttcc gaaaaaaaaa aaaaaaaaaa aa 472

<210> 104  
<211> 144  
<212> PRT  
<213> Ancylostoma caninum

<400> 104

Met Arg Ser Leu Cys Leu Leu Leu Ala Val Val Leu Val Ala Val His  
1 5 10 15

Ala Lys Met Gln Asn Val Thr Val Lys Gly Thr Thr Ile Cys Asn Lys  
20 25 30

Lys Arg Met Ala Asp Val Thr Val Glu Leu Trp Glu Arg Asp Thr Leu  
35 40 45

Asp Pro Asn Asp Leu Leu Asp Ser Lys Lys Thr Ser Arg Glu Gly Glu  
50 55 60

Phe Leu Gly Lys Gly Gly Gln Asn Glu Val Gly Ser Ile Glu Pro Phe

65                      70                      80  
Leu Lys Ile Thr His Thr Cys Asn Val Lys Lys Pro Gly Cys Lys Arg  
                            85                      90                      95  
Ile Thr Glu Phe Asp Ile Pro Lys Ser Lys Ile Asp Thr Val Tyr Asp  
                            100                      105                      110  
Met Thr Tyr Val Thr Leu Asp Ile Ile Ser Ala Val Asp Lys Glu Lys  
                            115                      120                      125  
Cys Tyr Met Asn Ala Leu Phe Ser Thr Ala Ile Phe Cys Ile Asp Arg  
                            130                      135                      140

<210> 105  
<211> 1442  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 105  
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tttcgcgtca accaactactt cgtgaacgat tgctgggaac tggcagttgg gaggactacc 180  
agaagcaacg ctatcactac cagaagaaac ttctggcaaa atatgcggca aacaaggcgt 240  
cgaaactaca gtccaccaat gagattgacg agctccttcg taactatatg gatgcacaat 300  
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gttcatccaa cctctgggtg ccgtccagga aatgcccatt ctacgacatc gcgtgcatgc 420  
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ctattcaata tggaactggc tcaatgaagg gtttcatttc taaggataat gtctgcatcg 540  
ccggaatttg tgctgtcgag caaccgtttg ccgaggcaac gagcgagcca ggcctcacgt 600  
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US seq list.ST25.txt

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acagcgacag tgacgaggat gatgtattca ctctctaaat aacatgtatc cacaatttgc	1380
tctaattctcg atacgtgtac cgtgtctcac gtgtttccac ttttgataaa ctgattattc	1440
tg	1442

<210> 106  
 <211> 446  
 <212> PRT  
 <213> Ancylostoma ceylanicum

<400> 106

Met Ala Arg Leu Val Leu Leu Leu Ala Leu Phe Thr Leu Ala Val Ala  
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Ser Val His Arg Arg Thr Phe His Gln Pro Arg Arg Tyr Val Lys Ser  
 20 25 30

Val Ser Leu Ser Arg Gln Pro Thr Leu Arg Glu Arg Leu Leu Gly Thr  
 35 40 45

Gly Ser Trp Glu Asp Tyr Gln Lys Gln Arg Tyr His Tyr Gln Lys Lys  
 50 55 60

Leu Leu Ala Lys Tyr Ala Ala Asn Lys Ala Ser Lys Leu Gln Ser Thr  
 65 70 75 80

Asn Glu Ile Asp Glu Leu Leu Arg Asn Tyr Met Asp Ala Gln Tyr Phe  
 85 90 95

Gly Thr Ile Gln Ile Gly Thr Pro Ala Gln Asn Phe Thr Val Ile Phe  
 100 105 110

Asp Thr Gly Ser Ser Asn Leu Trp Val Pro Ser Arg Lys Cys Pro Phe  
 115 120 125

Tyr Asp Ile Ala Cys Met Leu His His Arg Tyr Asp Ser Gly Ala Ser  
 130 135 140

Ser Thr Tyr Lys Glu Asp Gly Arg Lys Met Ala Ile Gln Tyr Gly Thr  
 145 150 155 160

Gly Ser Met Lys Gly Phe Ile Ser Lys Asp Asn Val Cys Ile Ala Gly  
 165 170 175

US seq list.ST25.txt

Ile Cys Ala Val Glu Gln Pro Phe Ala Glu Ala Thr Ser Glu Pro Gly  
180 185 190

Leu Thr Phe Ile Ala Ala Lys Phe Asp Gly Ile Leu Gly Met Ala Phe  
195 200 205

Pro Glu Ile Ser Val Leu Gly Val Pro Pro Val Phe His Thr Phe Ile  
210 215 220

Glu Gln Lys Lys Val Pro Ser Pro Val Phe Ala Phe Trp Leu Asn Arg  
225 230 235 240

Asn Pro Asp Ser Glu Leu Gly Gly Glu Ile Thr Leu Gly Gly Met Asp  
245 250 255

Pro Arg Arg Tyr Val Glu Pro Ile Thr Trp Thr Pro Val Thr Arg Arg  
260 265 270

Gly Tyr Trp Gln Phe Lys Met Asp Lys Val Gln Gly Gly Ser Thr Ser  
275 280 285

Ile Ala Cys Pro Asn Gly Cys Gln Ala Ile Ala Asp Thr Gly Thr Ser  
290 295 300

Leu Ile Ala Gly Pro Lys Ala Gln Val Glu Ala Ile Gln Lys Phe Ile  
305 310 315 320

Gly Ala Glu Pro Leu Met Lys Gly Glu Tyr Met Ile Pro Cys Asp Lys  
325 330 335

Val Pro Ser Leu Pro Glu Leu Ser Phe Val Ile Glu Gly Arg Thr Phe  
340 345 350

Ile Leu Lys Gly Glu Asp Tyr Val Leu Thr Val Lys Ala Gly Gly Lys  
355 360 365

Ser Ile Cys Leu Ser Gly Phe Met Gly Met Asp Phe Pro Glu Arg Ile  
370 375 380

Gly Glu Leu Trp Ile Leu Gly Asp Val Phe Ile Gly Lys Tyr Tyr Thr  
385 390 395 400

Val Phe Asp Ile Gly Gln Ala Arg Leu Gly Phe Ala Gln Ala Lys Ser  
405 410 415

Glu Asp Gly Tyr Pro Val Gly Pro Ala Val Arg Arg Tyr Asn Lys Phe  
420 425 430

US seq list.ST25.txt

Ser Glu Asp Ser Asp Ser Asp Glu Asp Asp Val Phe Thr Leu  
435 440 445

<210> 107  
<211> 582  
<212> DNA  
<213> Ancylostoma ceylanicum

<400> 107  
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caggacccca atgatcctga gcacatggcg agagcatgga aggcggcgaa aggtatcaat 180  
gaggatgcat ccaacgctgg accgtaccac atgattccca ttaagattgt caaggctgaa 240  
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<210> 108  
<211> 143  
<212> PRT  
<213> Ancylostoma ceylanicum

<400> 108

Met Pro Tyr Leu Ala Phe Ile Val Ala Leu Leu Ala Cys Thr Val Met  
1 5 10 15

Ser Gly His Gly Gln Met Thr Gly Gly Leu Thr Lys Gln Asp Pro Asn  
20 25 30

Asp Pro Glu His Met Ala Arg Ala Trp Lys Ala Ala Lys Gly Ile Asn  
35 40 45

Glu Asp Ala Ser Asn Ala Gly Pro Tyr His Met Ile Pro Ile Lys Ile  
50 55 60

Val Lys Ala Glu Ser Gln Val Val Ala Gly Val Arg Tyr Ile Phe Glu  
65 70 75 80

Val Leu Phe Gly Glu Ser Thr Cys Lys Lys Gly His Met Ala Ala Thr  
85 90 95

US seq list.ST25.txt

Glu Leu Ser Ala Ser Asn Cys Glu Leu Lys Glu Gly Gly Asn Arg Ala  
100 105 110

Leu Tyr Lys Val Glu Leu Trp Glu Lys Pro Trp Glu Asn Phe Glu Gln  
115 120 125

Phe Asn Val Glu Lys Ile Arg Asn Val Ala Ala Gly Glu Gln Ile  
130 135 140

<210> 109  
<211> 528  
<212> DNA  
<213> Necator americanus

<400> 109  
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tcgctcaggg accacaagga cccctccgt tcctgcaaag tgctccagcg gctgttcaac 120  
aagacttcga caagctcttc gtcaatgctg gctccaagac tgatgcagaa atcgacaaaa 180  
tggtccaaga ttgggttggc aaacaagatg catccatcaa gaccgcattc gatgcgttcg 240  
tgaaggaagt gaaagccgct caagcgcaag gtgaagctgc ccatcaggct gctatcgcca 300  
agttcagcgc agaggccaaa gcggctgatg ccaagctgag cgcaattgcg aacgacaggt 360  
cgaagacaaa cgcgcaaaag ggagctgaga tcgactcggg actcaaggga cttcctccaa 420  
atgtccgcac agagatcgaa aacgccatga aaggataaga agtctctatt ttgtatatat 480  
gaaccgataa atatgcacaa taaaaaaaaa aaaaaaaaaa aaaaaaaaaa 528

<210> 110  
<211> 146  
<212> PRT  
<213> Necator americanus

<400> 110

Met Leu Lys Leu Val Ala Leu Val Cys Leu Val Ala Ile Cys Phe Ala  
1 5 10 15

Gln Gly Pro Gln Gly Pro Pro Pro Phe Leu Gln Ser Ala Pro Ala Ala  
20 25 30

Val Gln Gln Asp Phe Asp Lys Leu Phe Val Asn Ala Gly Ser Lys Thr  
35 40 45

Asp Ala Glu Ile Asp Lys Met Val Gln Asp Trp Val Gly Lys Gln Asp  
50 55 60

Ala Ser Ile Lys Thr Ala Phe Asp Ala Phe Val Lys Glu Val Lys Ala  
65 70 75 80



US seq list.ST25.txt

Ala Gln Ala Gln Gly Glu Ala Ala His Gln Ala Ala Ile Ala Lys Phe  
85 90 95

Ser Ala Glu Ala Lys Ala Ala Asp Ala Lys Leu Ser Ala Ile Ala Asn  
100 105 110

Asp Arg Ser Lys Thr Asn Ala Gln Lys Gly Ala Glu Ile Asp Ser Val  
115 120 125

Leu Lys Gly Leu Pro Pro Asn Val Arg Thr Glu Ile Glu Asn Ala Met  
130 135 140

Lys Gly  
145

<210> 111  
<211> 1672  
<212> DNA  
<213> Necator americanus

<400> 111  
gaaaggttta attacccaag tttgaggatg aagattgccc tggttgttct gctgttagtc 60  
gcctacgcaa attctgcgga catcttcaga actgaatttg gagctaaaat aaaagcagag 120  
gcggataaaa gtaagacgaa actaaatatc tcctctcttc ttcaagtccg tgggaaattc 180  
ctcaagttaa gacaacagat caaggagagc ttagctctga ccccggaacg aaaagagttg 240  
ttgcataagt tgatgcagaa attagtagac atcaaaaagg atcatgttca taaggggtggt 300  
gactcaatcg atgaaatcaa taagaagggt ggaatgtcag atctgctcta cgatgggtgat 360  
atggttctaa cgaaagagca agccgaggaa atggttagcg atatcgacgg aagtggaagc 420  
aaccgtgcaa agcgtcaagc gtatcgtaac aaactttatc cgaaaacact ttggaccgat 480  
ggagttatct attattttcca tcctagtgcg acgaatagca tgcgaagtgt gttcctgaaa 540  
gcagcaaaaag aatggagctc tcaaacgtgt atcgatttcc atgaggatgt ggttggaatg 600  
ggcccaaaca ggatcaagggt tttcaaagag aaagggtgtt ggtcgatggt tggacgactc 660  
cctcgtccac aggagctttc gttgggaaga ggatgtgata cgattgccac agcacaacac 720  
gagatcggcc atgcgctggg attcttccac cagcaggcta gacacgatcg cgatgactac 780  
attgtattta attcagagaa tgtagtgccg cgatatctgg atcaattcaa gaaacagagc 840  
aaagaaacaa acgataatta cggattaact tatgattacg gaagcaccat gcagtacgga 900  
tcgaccagcg gatcccaaaa tggaaaacct acaatggtgc caaaagatcc taaatatata 960  
gaaaccctgg gatcaccttt cattgcattc tacgatttac tggcaataaa tacgcactac 1020  
aaatgtcttg agaaatgcga taataatggg gcacaatgca aaatgggtgg attccctaatt 1080

US seq list.ST25.txt

ccaagagatt gctcaaaatg catttgtccc agtggatacg gtggcgctac atgtgaccag 1140  
 aaacctgaag gatgtggtga agtacttgaa gcaacgaagg aggctaaaac cctcaaaagt 1200  
 gaaattggag ataaaagtgc aggagatgag gacagagagg acatgaccaa gtgttactat 1260  
 tggatcaagg caccggaagg atcgaaagtt gaggttaaga tcgtaaacct agctaaaggt 1320  
 cttgccattg atggatgcag atattgggggt gtggaaatta aaactcagga ggatcaacgt 1380  
 gcttccggat acagattctg cgctcccga gatgctggcg tcactttgga gtcgcactcg 1440  
 aatattgtcc ctataatagc gttcaataga cacggctcta ctgaatttga attacagtac 1500  
 cgaatcgat aattctgcgt gaccaacgct tctcctaaga gacgagaaag ttctgcaaca 1560  
 atactttatt catgtataac aatataggag agtttttctt agtagaagta ctttctttgt 1620  
 tggttctcca gaaataaacg atttccatgc aaaaaaaaaa aaaaaaaaaa aa 1672

<210> 112  
 <211> 494  
 <212> PRT  
 <213> Necator americanus

<400> 112

Met Lys Ile Ala Leu Val Val Leu Leu Leu Val Ala Tyr Ala Asn Ser  
 1 5 10 15

Ala Asp Ile Phe Arg Thr Glu Phe Gly Ala Lys Ile Lys Ala Glu Ala  
 20 25 30

Asp Lys Ser Lys Thr Lys Leu Asn Ile Ser Ser Leu Leu Gln Val Arg  
 35 40 45

Gly Lys Phe Leu Lys Leu Arg Gln Gln Ile Lys Glu Ser Leu Ala Leu  
 50 55 60

Thr Pro Glu Arg Lys Glu Leu Leu His Lys Leu Met Gln Lys Leu Val  
 65 70 75 80

His Ile Lys Lys Asp His Val His Lys Gly Gly Asp Ser Ile Asp Glu  
 85 90 95

Ile Asn Lys Lys Val Gly Met Ser Asp Leu Leu Tyr Asp Gly Asp Met  
 100 105 110

Val Leu Thr Lys Glu Gln Ala Glu Glu Met Val Ser Asp Ile Asp Gly  
 115 120 125

Ser Gly Ser Asn Arg Ala Lys Arg Gln Ala Tyr Arg Asn Lys Leu Tyr  
 130 135 140

US seq list.ST25.txt

Pro Lys Thr Leu Trp Thr Asp Gly Val Ile Tyr Tyr Phe His Pro Ser  
145 150 155 160

Ala Thr Asn Ser Met Arg Ser Val Phe Leu Lys Ala Ala Lys Glu Trp  
165 170 175

Ser Ser Gln Thr Cys Ile Asp Phe His Glu Asp Val Val Gly Met Gly  
180 185 190

Pro Asn Arg Ile Lys Val Phe Lys Glu Lys Gly Cys Trp Ser Met Val  
195 200 205

Gly Arg Leu Pro Arg Pro Gln Glu Leu Ser Leu Gly Arg Gly Cys Asp  
210 215 220

Thr Ile Ala Thr Ala Gln His Glu Ile Gly His Ala Leu Gly Phe Phe  
225 230 235 240

His Gln Gln Ala Arg His Asp Arg Asp Asp Tyr Ile Val Phe Asn Ser  
245 250 255

Glu Asn Val Val Pro Arg Tyr Leu Asp Gln Phe Lys Lys Gln Ser Lys  
260 265 270

Glu Thr Asn Asp Asn Tyr Gly Leu Thr Tyr Asp Tyr Gly Ser Thr Met  
275 280 285

Gln Tyr Gly Ser Thr Ser Gly Ser Gln Asn Gly Lys Pro Thr Met Val  
290 295 300

Pro Lys Asp Pro Lys Tyr Ile Glu Thr Leu Gly Ser Pro Phe Ile Ala  
305 310 315 320

Phe Tyr Asp Leu Leu Ala Ile Asn Thr His Tyr Lys Cys Leu Glu Lys  
325 330 335

Cys Asp Asn Asn Gly Ala Gln Cys Lys Met Gly Gly Phe Pro Asn Pro  
340 345 350

Arg Asp Cys Ser Lys Cys Ile Cys Pro Ser Gly Tyr Gly Gly Ala Thr  
355 360 365

Cys Asp Gln Lys Pro Glu Gly Cys Gly Glu Val Leu Glu Ala Thr Lys  
370 375 380

Glu Ala Lys Thr Leu Lys Ser Glu Ile Gly Asp Lys Ser Ala Gly Asp  
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US seq list.ST25.txt  
 385 390 395 400

Glu Asp Arg Glu Asp Met Thr Lys Cys Tyr Tyr Trp Ile Lys Ala Pro  
 405 410 415

Glu Gly Ser Lys Val Glu Val Lys Ile Val Asn Leu Ala Lys Gly Leu  
 420 425 430

Ala Ile Asp Gly Cys Arg Tyr Trp Gly Val Glu Ile Lys Thr Gln Glu  
 435 440 445

Asp Gln Arg Ala Ser Gly Tyr Arg Phe Cys Ala Pro Glu Asp Ala Gly  
 450 455 460

Val Thr Leu Glu Ser His Ser Asn Ile Val Pro Ile Ile Ala Phe Asn  
 465 470 475 480

Arg His Gly Ser Thr Glu Phe Glu Leu Gln Tyr Arg Ile Val  
 485 490

<210> 113  
 <211> 759  
 <212> DNA  
 <213> Necator americanus

<400> 113  
 acttcaagcg atgttccgctc ctgctactgc cgtccttcta ttgttggccg cgtccagcac 60  
 atttgctgga tttttcgatg atgttggagg cttaccagct ggtgtgggag attttttcac 120  
 aaagcagttc aacaatgtga aggatctttt tgctaaagat caagatactc ttgagaagaa 180  
 tatcaatctg gtaaaggatc tattgattgc cattaaggag aaggctaaga tgctggaacc 240  
 gatggccaac gaggctcaga agaagacatt agggcagggt gacaactatc tcaatgaagt 300  
 tcaacagttc ggcgatcagg tagccaagga gggttctacg aaatttgagg agaacaaagg 360  
 gaaatggcag caaatgttga acgatatctt cgagaaaggt ggactggaca gcgtgatgaa 420  
 gttgctcaat ctgaagtccg gcggtcgctg cacgtagacc gctgcactcg tcgctcccgt 480  
 tgtgctcgcg ctcatccgct aattcacttc taccgccgcc gactactgta gtttaccctg 540  
 tgcctgtgtg tgatatgtgg atttgtgcat gatgtgtatc tatgatttgt gatttatttt 600  
 tctctgtac ttccatgaat tcagctctgg tattctgaga cggaccaaca tctccgcagt 660  
 acttttttgt attgttatca tcaccgtaat cctgtgactg gcgtaaaatg tttagttttc 720  
 cgataaaata catttcgaaa aaaaaaaaaa aaaaaaaaaa 759

<210> 114  
 <211> 163  
 <212> PRT

US seq list.ST25.txt

<213> Necator americanus

<400> 114

Met Phe Arg Pro Ala Thr Ala Val Leu Leu Leu Leu Ala Ala Ser Ser  
1 5 10 15

Thr Phe Ala Gly Phe Phe Asp Asp Val Gly Gly Leu Pro Ser Gly Val  
20 25 30

Gly Asp Phe Phe Thr Lys Gln Phe Asn Asn Val Lys Asp Leu Phe Ala  
35 40 45

Lys Asp Gln Asp Thr Leu Glu Lys Asn Ile Asn Leu Val Lys Asp Leu  
50 55 60

Leu Ile Ala Ile Lys Glu Lys Ala Lys Met Leu Glu Pro Met Ala Asn  
65 70 75 80

Glu Ala Gln Lys Lys Thr Leu Gly Gln Val Asp Asn Tyr Leu Asn Glu  
85 90 95

Val Gln Gln Phe Gly Asp Gln Val Ala Lys Glu Gly Ser Thr Lys Phe  
100 105 110

Glu Glu Asn Lys Gly Lys Trp Gln Gln Met Leu Asn Asp Ile Phe Glu  
115 120 125

Lys Gly Gly Leu Asp Ser Val Met Lys Leu Leu Asn Leu Lys Ser Gly  
130 135 140

Gly Arg Cys Thr Leu Ala Ala Ala Leu Val Ala Pro Val Val Leu Ala  
145 150 155 160

Leu Ile Arg